A Stereo-Atlas of Ostracod Shells

edited by I. Boomer, D. J. Horne, A. R. Lord and D. J. Siveter

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The front cover shows two specimens of *Cytheropteron bronwynae* Joy & Clark, 1977 from a Recent sample on the Morris Jesup Rise, Arctic Ocean (lat. 85° 19.4′N, long. 14° 0′W). Upper specimen, RV of a male carapace, dorsal view, BMNH no. **1995.1281**), lower specimen, RV, external lateral view, BMNH no. **1995.1288**). This species was illustrated in *Stereo-Atlas of Ostracod Shells*, **22**, 41–44.

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Contents

1	On *Swainocythere miniscula* (Ruggieri); by C.P. Dickson.	1
2	On *Pellucistoma punctata* Ayress sp. nov.; by M. Ayress.	5
3	On *Hemicytherura fulva* McKenzie, Reyment & Reyment; by K.G. McKenzie, R.A. Reyment & E.R. Reyment.	9
4	On *Eucytherura loenensis* sp. nov.; by I. Boomer.	13
5	On *Scepticocythereis sanctivincentis* sp. nov.; by S. Majoran.	17
6	On *Schizocythere inexpecta* sp. nov.; by S. Majoran.	21
7	On *Echinocythereis leckwycki* sp. nov.; by K. Wouters.	25
8	On *Orionina caboverdensis* sp. nov.; by K. Wouters.	29
9	On *Darwinula incae* (Delachaux); by G. Rossetti, K. Martens & P. Mourguiart.	35
10	On *Wenlockiella phaseola* (Jones); by L.E. Petersen & R.F. Lundin.	41
11	On *Cytherellina elegans* (Jones); by L.E. Petersen & R.F. Lundin.	45
12	On *Cytherellina ruperti* sp. nov.; by L.E. Petersen & R.F. Lundin.	49
13	On *Ogmoconcha contractula* Triebel; by I. Boomer & T. Jellinek.	53
14	On *Eucypris virens* (Jurine); by R. Smith & K. Martens.	61
15	On *Baltonotella kuckersiana* (Bonnema); by R.E.L. Schallreuter.	69
16	On *Karinutatia ren* Schallreuter; by R.E.L. Schallreuter.	73
17	On *Soanella ovalis* (Ivanova); by R.E.L. Schallreuter.	77
18	On *Valentella costata* (Ivanova); by R.E.L. Schallreuter.	81
19	On *Trapezilites minimus* (Kummerow); by I.C.U. Hinz-Schallreuter.	85
20	On *Falites fala* Müller; by I.C.U. Hinz-Schallreuter.	89
21	On *Cytheropteron kempfi* nom. nov.; by I. Boomer.	95
22	Index for volume 23 (1996).	96

ON *SWAINOCYTHERE MINISCULA* RUGGIERI

by Carol P. Dickson
(School of Geography, Kingston University, Surrey)

Swainocythere miniscula Ruggieri, 1976

1975 *Cytheropteron? minisculum* sp. nov. G. Ruggieri, A. Unti, M. Unti, and M.A. Moroni, *Soc. Geol. Ital., Boll.*, **94**: 1654.
1981 *Swainocythere chejudoensis* sp. nov. K. Ishizaki. *Tohoku Univ., Sci. Rep.*, 2nd ser. (Geol.), **51** (1-2): 37-65.

Type Specimens: Believed to be deposited in the personal collection of Ruggieri (Palermo, Italy); figured holotype no. **O.C.R. Sl. 2602a** female carapace:
Figured paratype no **O.C.R. Sl. 2602b** male carapace; unfigured paratype no. **O.C.R. Sl. 2602c.**

Type locality: Lower Pleistocene glauconitic clayey sand with *Pecten* shells at the base of calcarenites in a cave opening at Piano Messina, between Campobello and Mazara, SSW of kilometre post 63 of S.S. 115, westernmost Sicily, Italy (latitude 37° 32′ N and longitude 12° 40′ E).

Figured specimens: Deposited in the collections of the British Geological Survey, Keyworth, England. No. **BGS 89/15-1.1-1** (♀ LV: Pl. **23**, 2, fig. 1) from 1.05-1.15 m down core; no. **BGS 89/15-1.1-2** (♀ RV: Pl. **23**, 2, figs. 2, 4-5) from 1.05-1.15 m down core; no. **BGS 89/15-1.1-3** (♂ LV: Pl. **23**, 2, fig. 3) from 1.05-1.15m down core; no. **BGS 89/15-1.1-4** (♀ Pl. **23**, 4, figs. 1, 3-4) from 1.05-1.15 m down core; no. **BGS 89/15-2.85-5** (♀ RV: Pl. **23**, 4, fig. 2) from 2.8-2.9 m down core; no. **BGS 89/15-5.85-6** (A-1 RV: Pl. **23**, 4, fig. 5) from 5.8-5.9 m down core. All specimens from the Holocene sediments of BH 89/15 (latitude 54° 02.208′ N, longitude 5° 20.645′ W, from the northern Irish Sea, present day water depth 92 m).

Explanation of Plate 23, 2

Fig. 1, ♀ LV, ext. lat. **BGS 89/15-1.1-1**, 241 μm long); figs. 2, 4-5, ♀ RV, int. lat. **BGS 89/15-1.1-2**, 249 μm long; fig. 2, anterior hinge; fig. 4, hinge; fig. 5, posterior hinge; fig. 3, ♂ LV, ext. lat. **BGS 89/15-1.1-3**, 238 μm long).
Scale A (100 μm; ×200), figs. 1, 3; scale B (20 μm; ×600), figs. 2, 5; scale C (100 μm; ×300), fig. 4.

Diagnosis: Carapace small; sub-trapezoid in outline; dorsal and ventral margins sinuous, anterior margin rounded and posterior margin tapering to a short caudal process. Greatest height anterior of mid-length. Marginal ridge runs sub-parallel to the margins and provides a distinct shoulder. Small punctae cover the surface and extend in rows sub-parallel to the margins, the rows of puncta lie between gentle ridges. Hinge modified antimerodont, the right valve terminal teeth are fairly large, the median element is smooth centrally but becomes loculate posteriorly and only very weakly so anteriorly, the left valve has complementary elements.

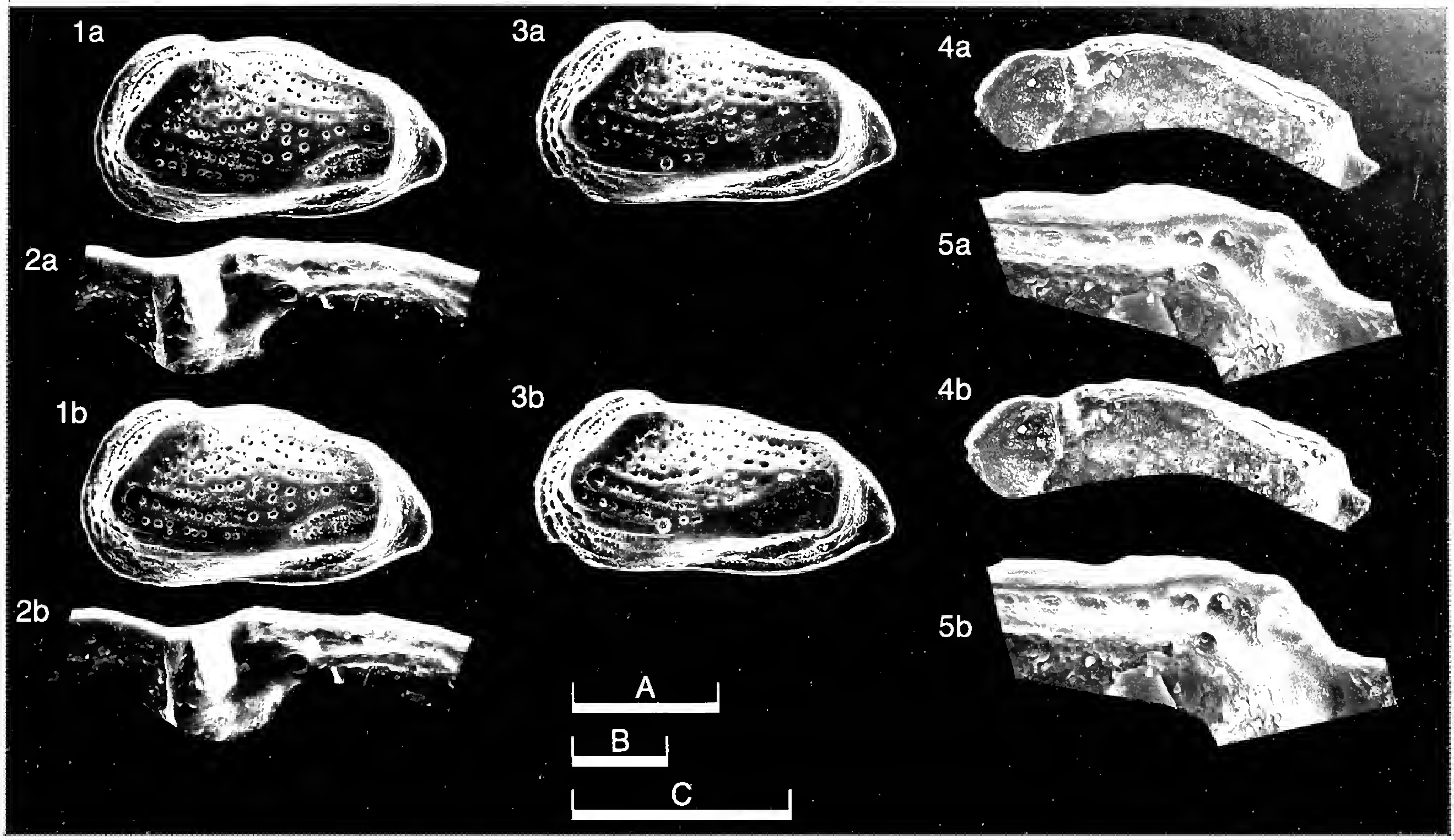
Remarks: Ruggieri *et al.* (*op. cit.*, 1975) tentatively assigned this species to the genus *Cytheropteron* Sars, 1866. Ishizaki (1981 *Tohoko Univ. Sci. Rep.*, 2nd ser. (Geol.), **51** (1-2), 37-65) studying ostracods from the East China Sea, established the genus *Swainocythere* with the type species *S. chejudoensis* Ishizaki, 1981. *Cytheropteron* and *Swainocythere* are similar in the character of the hinge structure and in the arrangement of the radial pore canals although the two genera can be distinguished in general appearance, *Swainocythere* being more elongate and lacking an alar process (Ishizaki, 1981). The species *S. chejudoensis* Ishizaki, 1981 may be conspecific with *Cytheropteron? minisculum* Ruggieri, 1976. The East China Sea specimens differ slightly from the type specimens of *S. minisculum* and those figured herein, in that the surface ornament is more strongly ridged and the hinge structure is less modified, as in the right valve the anterior and posterior teeth are smaller and the median element is more strongly loculate throughout. Other species of this genus include *Swainocythere nanseni* (Joy and Clark, 1981) (Correge *et al.*, *Stereo-Atlas Ostracod Shells*, **19**, 107-110, 1992) and two other undescribed species from the Arctic and South Pacific waters; which underlines the circum-polar nature of this genus. The difference between this species and *S. nanseni* (Joy and Clark, 1981) are described in Correge *et al.* (1992, *op. cit.*).

Distribution: Lower Pleistocene of Italy (Ruggieri, 1975); Holocene to Recent of the Celtic and Irish Seas (herein) at depths of greater than 80 m.

Acknowledgement: I would like to thank Robin Whatley for reviewing the manuscript.

Explanation of Plate 23, 4

Fig. 1, 3-4, ♀ LV, int. lat. (**BGS 89/15-1.1-4**, 250 μm long); fig 1, posterior hinge; fig 3, hinge; fig. 4, anterior hinge; fig. 2, ♀ RV, ext. lat. (**BGS 89/15-2.85-5**, 223 μm long); fig. 5, A-1 RV, ext. lat. (**BGS 89/15-5.85.6**, 219 μm long).
Scale A (20 μm; ×600), figs. 1, 4; scale B (100 μm; ×200), fig. 2, 3; scale C (100 μm; ×230), fig. 5.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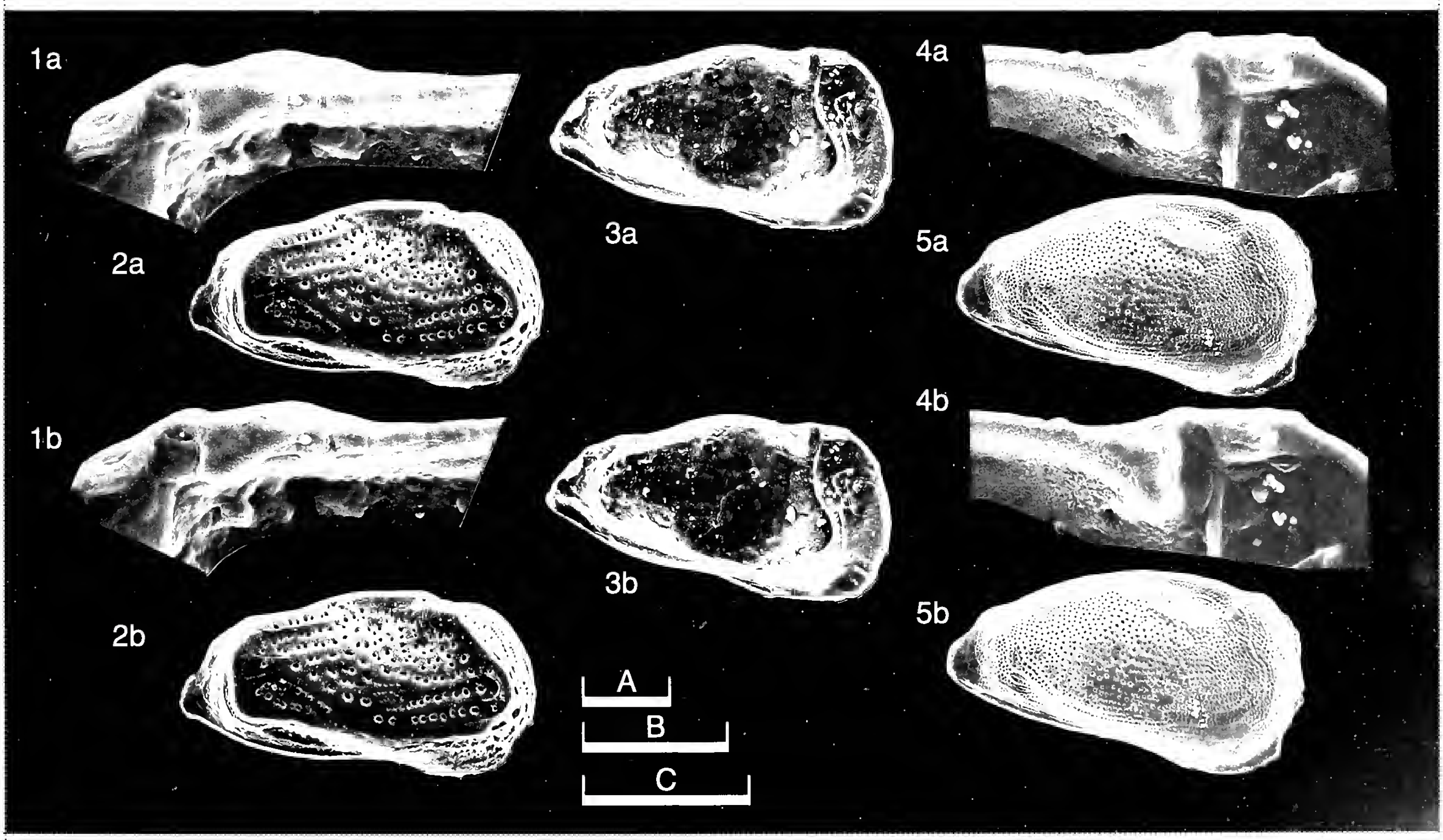
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ON *PELLUCISTOMA PUNCTATA* AYRESS sp. nov.

by Michael A. Ayress
(Department of Geology, Australian National University, Canberra, Australia)

Pellucistoma punctata sp. nov.

Holotype: National Museum of Victoria, Melbourne, Australia, no. **P197956**, Male, LV.

Type locality: Tasman Sea, Institute of Oceanographic Sciences, Sydney core 1/86 6GC3, 30–31 cm, West Lord Howe Rise, water depth 1540 m. Latitude 32° 58.8′ S, longitude 159° 59.9′ E. Holocene foraminiferal ooze.

Derivation of name: Referring to the punctate ornament of this species.

Figured specimens: National Museum of Victoria, Melbourne, Australia, nos. **P197956** (holotype, LV: Pl. **23**, 2 figs. 1, 4; Pl. **23**, 4, fig. 1), **P197957** (paratype, RV: Pl. **23**, 2, figs. 2, 5; Pl. **23**, 4, fig. 2), **P197958** (incomplete paratype, RV: Pl. **23**, 2, fig. 3). The holotype and paratype (**P197957** are from the type locality and horizon. The paratype (**P197958**) is from the Lord Howe Rise, Tasman Sea (water depth 1340 m) Late Pleistocene sample at 97.5 cm in core Sonne 36–61.

Diagnosis: A species of *Pellucistoma* with a finely punctate carapace, subrectangular in lateral view. Hinge in the left valve supported by an antislip tooth at both ends. Sexual dimorphism not apparent in available material.

Explanation of Plate 23, 6

Figs. 1, 4, LV (holotype, **P197956**, 420 μm long): fig. 1, ext. lat.; fig. 4, ant. anti-slip tooth. Figs. 2, 5, RV (**P197957**, 420 μm long): fig. 2, ext. dors.; fig. 5, ext. lat. Fig. 3, RV, subcentral muscle scars, (**P197958**, 300 μm incomplete length). Scale A (100 μm; ×145), figs. 1, 2, 5; Scale B (50 μm, ×420), fig. 3; Scale C (20 μm, ×800), fig. 4.

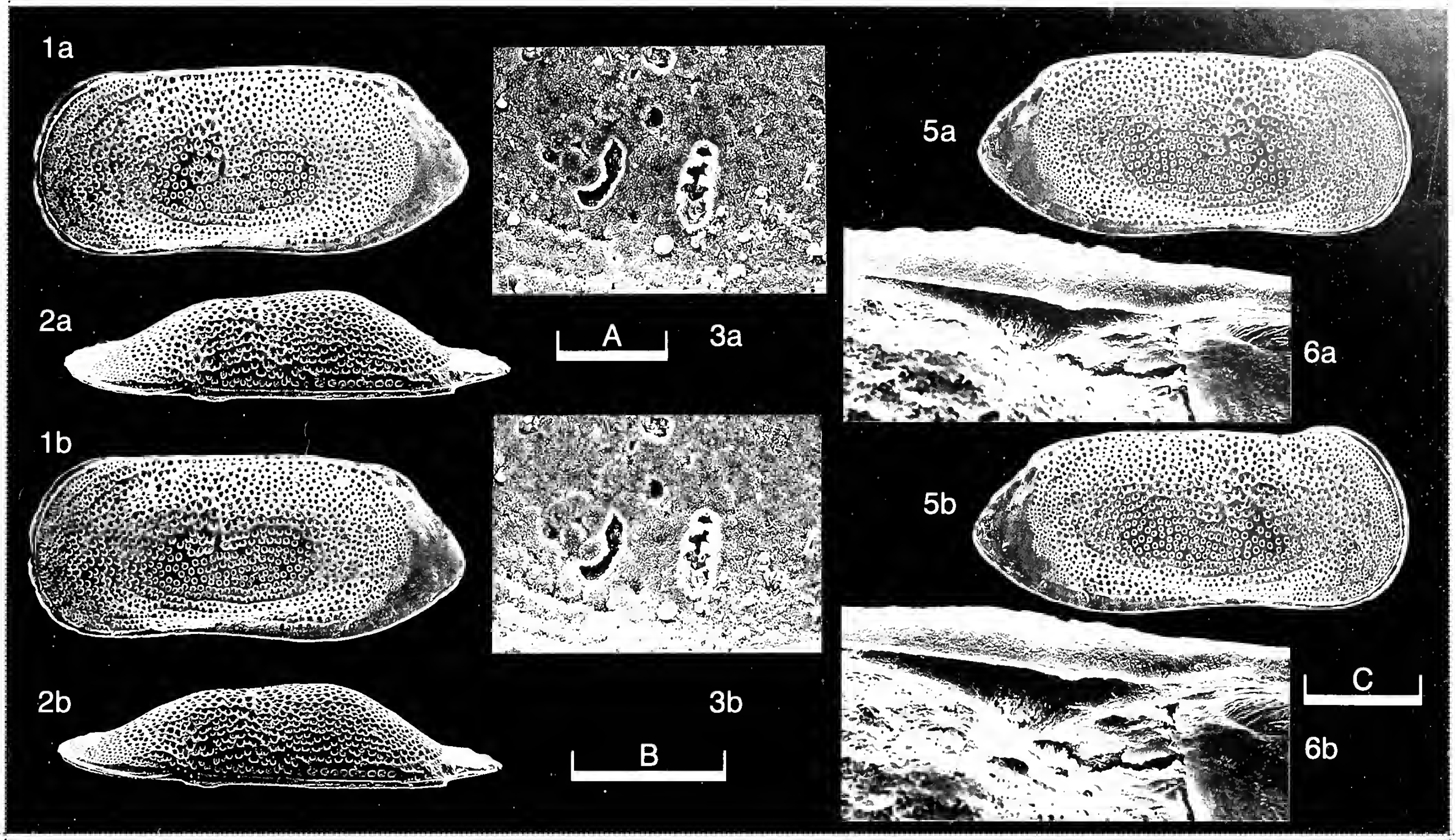
Remarks: In almost all aspects this species is identical to *Pellucistoma coombsi* Ayress, 1990 (*New Zealand Nat. Sci.* **17**, 68) known from the Late Eocene to Recent of New Zealand, and has probably descended from that species. *Pellucistoma punctata* differs from *P. coombsi* most notably in its punctate surface, the surface of the latter species being smooth. Carapace ornament appears to be a rare feature of the genus hitherto recorded, to the authors knowledge, only in the Tertiary of the Caribbean, e.g. *Pellucistoma? spurium* Bold (Bold, *Bull. Am. Pal.*, **94** (329), 66, pl. 12, figs 9–12, 1988). The discovery of *P. punctata* is the first record of the genus from bathyal depths. Comparisons between the central American *Pellucistoma* and the Indo-Pacific *Javanella* suggest that the two genera are synonymous separated only on geographical grounds (Howe and McKenzie, 1989 (*N. Terr. Mus. Arts & Sci.*, monograph 3, 50p); Ayress, 1990 *op. cit.*).

Distribution: Late Quaternary to Recent of the Tasman and Coral Seas: sample at 30 cm (Holocene) and 125 cm (Late Pleistocene) in Ocean Sciences Institute, University of Sydney core 1/86 6GC3 (water depth 1540 m); sample at 97.5 cm (Late Pleistocene) in core Sonne 36–61 (water depth 1340 m); James Cook University surface sediment grab sample 590/9 (water depth 1242 m); and sample at 35 cm (Holocene) in core V24-160 (water depth 1007 m).

Acknowledgement: The staff of the Electron Microscope Unit (ANU) are thanked for their assistance.

Explanation of Plate 23, 8

Fig. 1, LV, int. lat. (**P197956**, 420 μm long). Fig. 2, RV, int. lat. (**P197957**, 420 μm long).
Scale A (100 μm; ×225), figs. 1, 2.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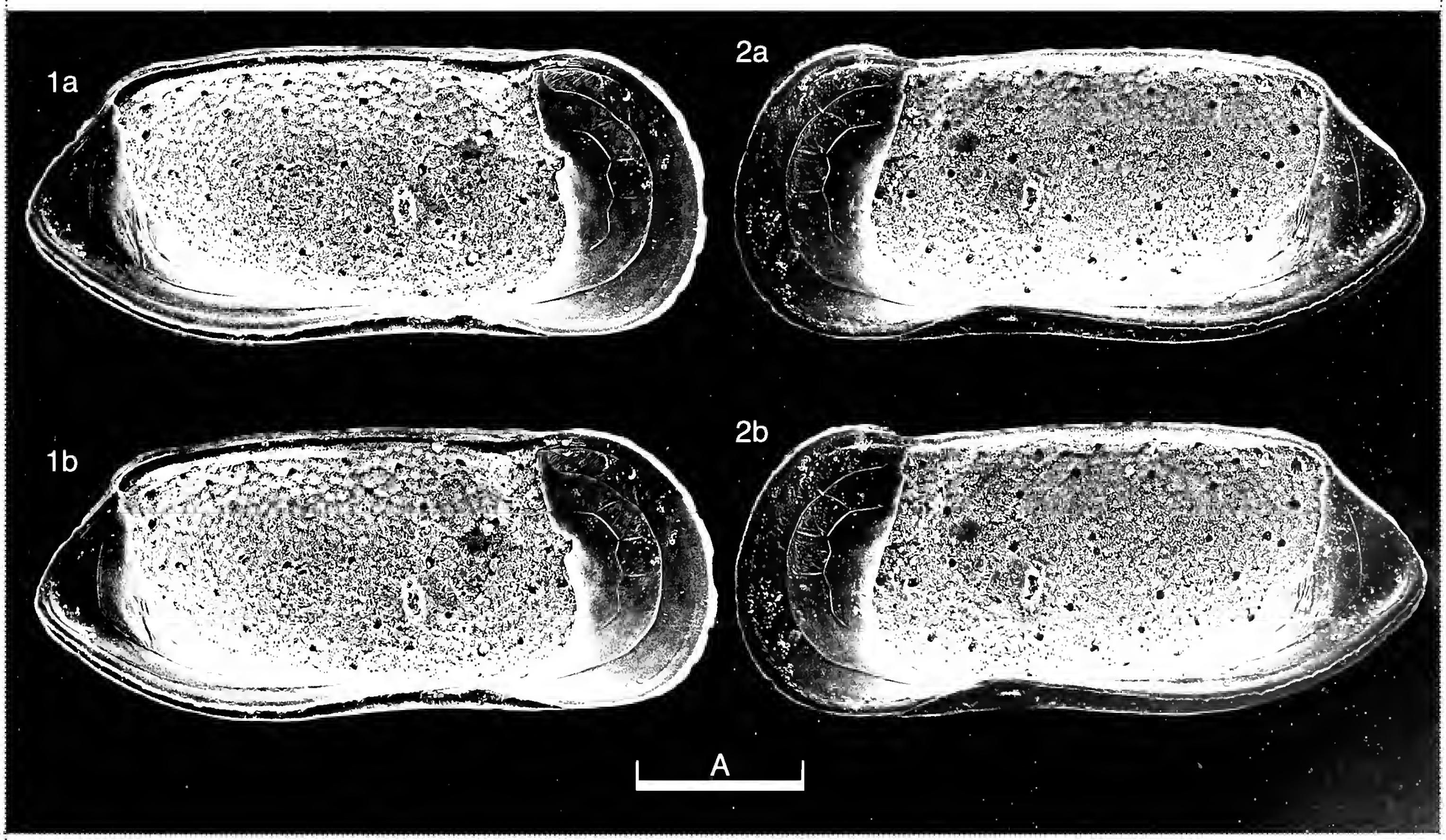
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ON *HEMICYTHERURA FULVA* McKENZIE, REYMENT & REYMENT

by Ken G. McKenzie[1], Richard A. Reyment[2] and Eva R. Reyment[2]
*([1]Geology School, University of Melbourne, Victoria, Australia,
[2]Institute of Earth Sciences, University of Uppsala, Uppsala, Sweden)*

Hemicytherura fulva McKenzie, Reyment and Reyment, 1993

1993 *Hemicytherura fulva* K.G. McKenzie, , R.A. Reyment and E.R. Reyment, *Revta Esp. Paleontol.*, **8**, 97, Pl. 4, figs. 18–20.

Holotype: Palaeontological Museum, Institute of Earth Sciences, University of Uppsala, Sweden, **PMAus441**, male carapace, SEM stub Vic-2 (K1).

Type Locality: Browns Creek, Victoria, southeastern Australia, long. 142.15° E, lat. 38.18° S. Late Eocene.

Figured specimens: Palaeontological Museum, Institute of Earth Sciences, University of Uppsala. **PMAus441** (holotype, male car.: Pl. **23**, 10, fig. 1), **PMAus441-1** (female car.: Pl. **23**, 10, fig. 2), **PMAus441-2** (car.: pl. **23**, 10, fig. 3), **PMAus443** (paratype, female? LV: Pl. **23**, 12, fig. 1), **PMAus442** (paratype, female car.: Pl. **23**, 12, fig. 2), **PMAus441-3** (car.: Pl. **23**, 12, fig. 3). All specimens from the type locality, Eocene, Victoria.

Explanation of Plate 23, 10

Fig. 1. Male car., lt. lat. (holotype, **PMAus441**, 338 μm long). Fig. 2. Female car., rt. Lat. oblique (**PMAus441-1**, 361 μm long). Fig. 3. Adult car., vent. (**PMAus441-2**, 350 μm long).
(Scale = 50 μm; ×180).

Diagnosis: Small, oval in lateral view, subcaudate; ornament consists of a longitudinal median rib and a marginal ridge that rims each valve almost continuously; diagonal ribs, often bearing finer reticulation, cross the lateral surfaces. Polymorphic, one morph having lace-like costulations ("laced"), the other with greatly subdued ornament ("effaced"), the latter being the most frequently recorded morph is defined in the main diagnosis. Dorsum convex; anteroventral margin subacuminate, bearing a few marginal denticles; venter almost straight (and partly overlapped by the ventromarginal ridge in lateral view); posterior cauda form a depressed platform behind the posteromarginal ridge. Greatest height medial; subhastate in dorsal view, broadest posteromedially. Muscle scars and hinge typical of the genus. Sexual dimorphism weakly developed with females slightly larger than males.

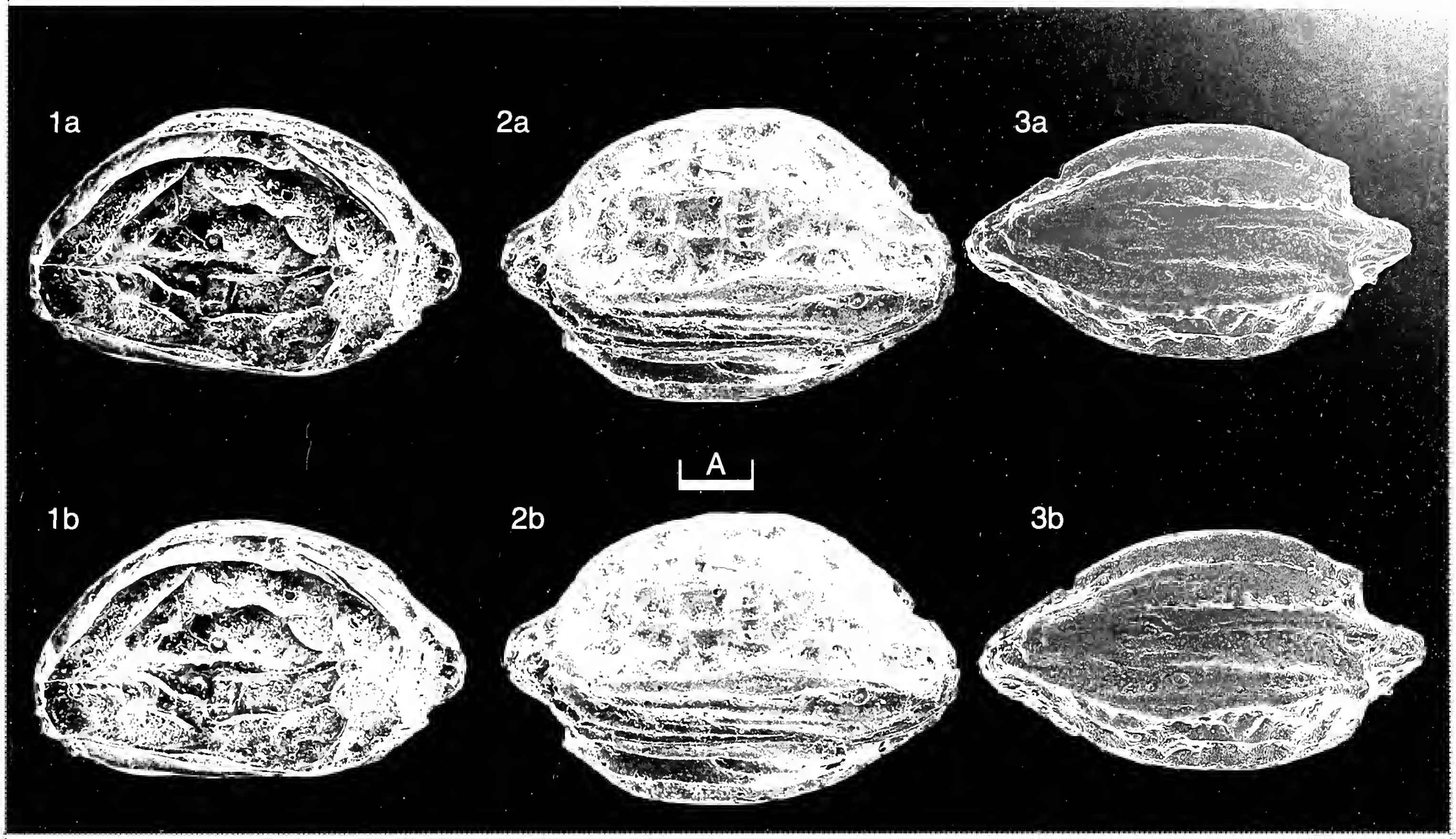
Remarks: The ornament of this species is unlike that of any previously reported Australian *Hemicytherura*. Polymorphism in ostracods may involve variations in size, shape, ornament, or a combination of all three. It is most commonly due to ecophenotypy, but genuine cases of evolutionary polymorphism also occur. polymorphism om *H. fulva* is well developed and has recently been studied by geometric morphometrics (Reyment, R.A., *Revta esp. Paleontol.* **8**, 125–131, 1993). The "laced" morph encompasses adults that retain, in part, a larval aspect.

At Browns Creek, *H. fulva* ranges from 7 m below the contact of the Browns Creek Clay with the Johanna River Greensand Member, all Eocene.

Distribution: Castle Cove and Browns Creek, Victoria, southeastern Australia; Middle? to Late Eocene.

Explanation of Plate 23, 12

Fig. 1. Female? LV. int. detail of hinge and muscle scars (paratype, **PMAAus443**, 356 μm long). Fig. 2. Female car., dors. (paratype, **PMAus442**, 361 μm long). Fig. 3. Male car., lt. Lat. ("laced" morph), (**PMAus441-3**, 334 μm long).
(Scale = 50μm; ×180).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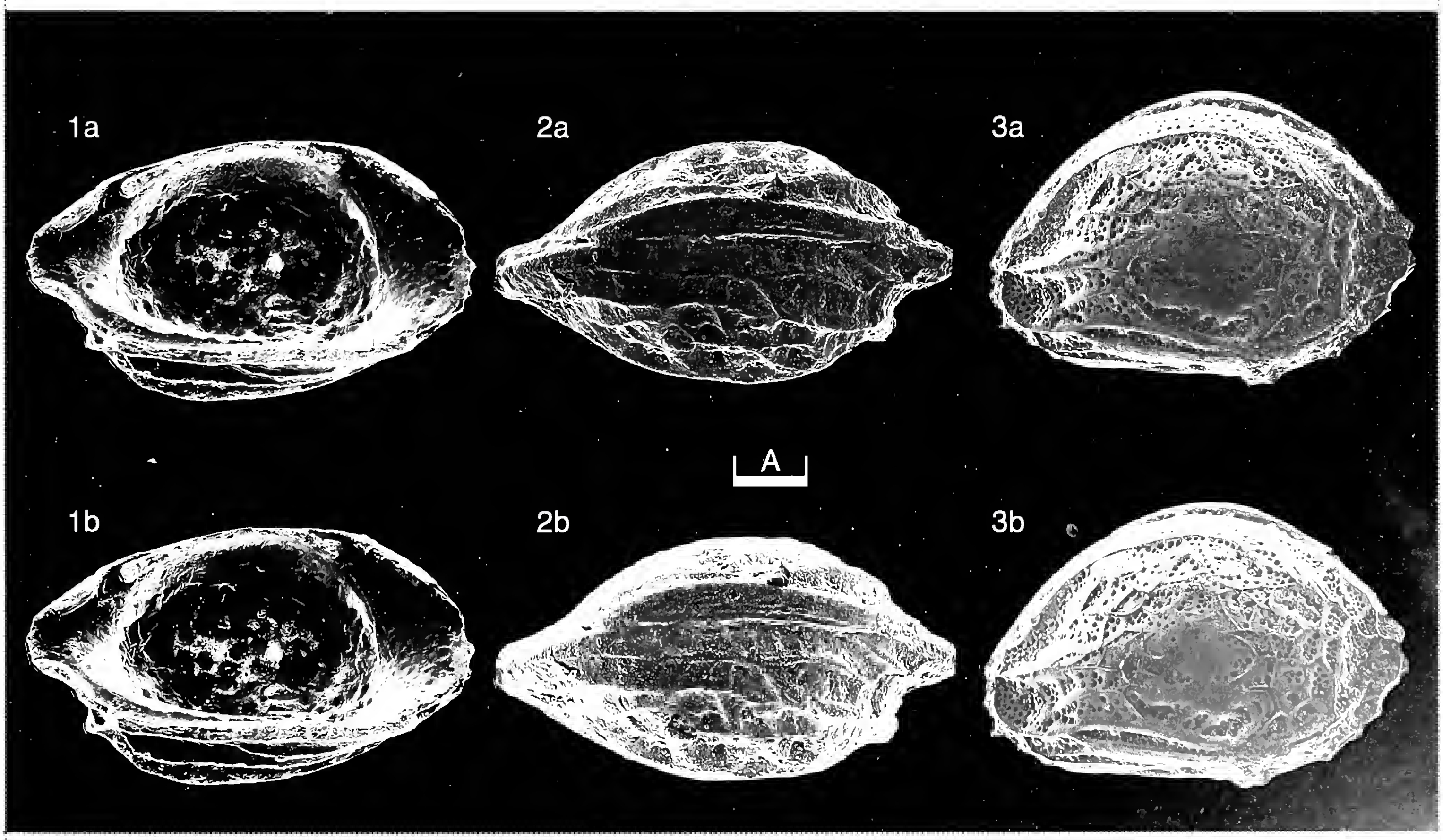
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ON *EUCYTHERURA LOENENSIS* BOOMER sp. nov.

by Ian Boomer
(School of Environmental Sciences, University of East Anglia, Norwich, England, U.K.)

Eucytherura loenensis sp. nov.

Holotype: The Natural History Museum, London [BMNH] no. **OS 14896**; adult RV. [Paratype: no. **OS 14897**].

Type locality: Lo En Guyot, Central Pacific Ocean, Ocean Drilling Program, Leg 144, Site 872C, (10° 5.8′ N, 162° 51.9′ W) Core 16, core-catcher (0–8 cm); Upper Oligocene.

Derivation of name: With reference to the type locality Lo En Guyot, Central Pacifc Ocean.

Figured specimens: The Natural History Museum, London [BMNH] nos. **OS 148896** (holotype, LV: Pl. **23**, 14, figs. 1, 2, 4, Pl. **23**, 16, figs. 1, 2, 5), **OS 14897** (paratype, RV: Pl. **23**, 14, fig. 3, Pl. **23**, 16, figs. 3, 4).). Both holotype and paratype from type level and locality.

Explanation of Plate 23, 14

Fig. 1, 2, 4, RV (holotype, **OS 14896**, 290 μm long): fig. 1 ext. lat.; fig. 2 dors.; fig. 4 int. lat. Fig. 3, RV, dors. (paratype. **OS 14897**, 290 μm long).
Scale A (100 μm; ×225), fig. 1; scale B (100 μm; ×205), figs. 2, 3; scale C (100 μm; ×235), fig. 4.

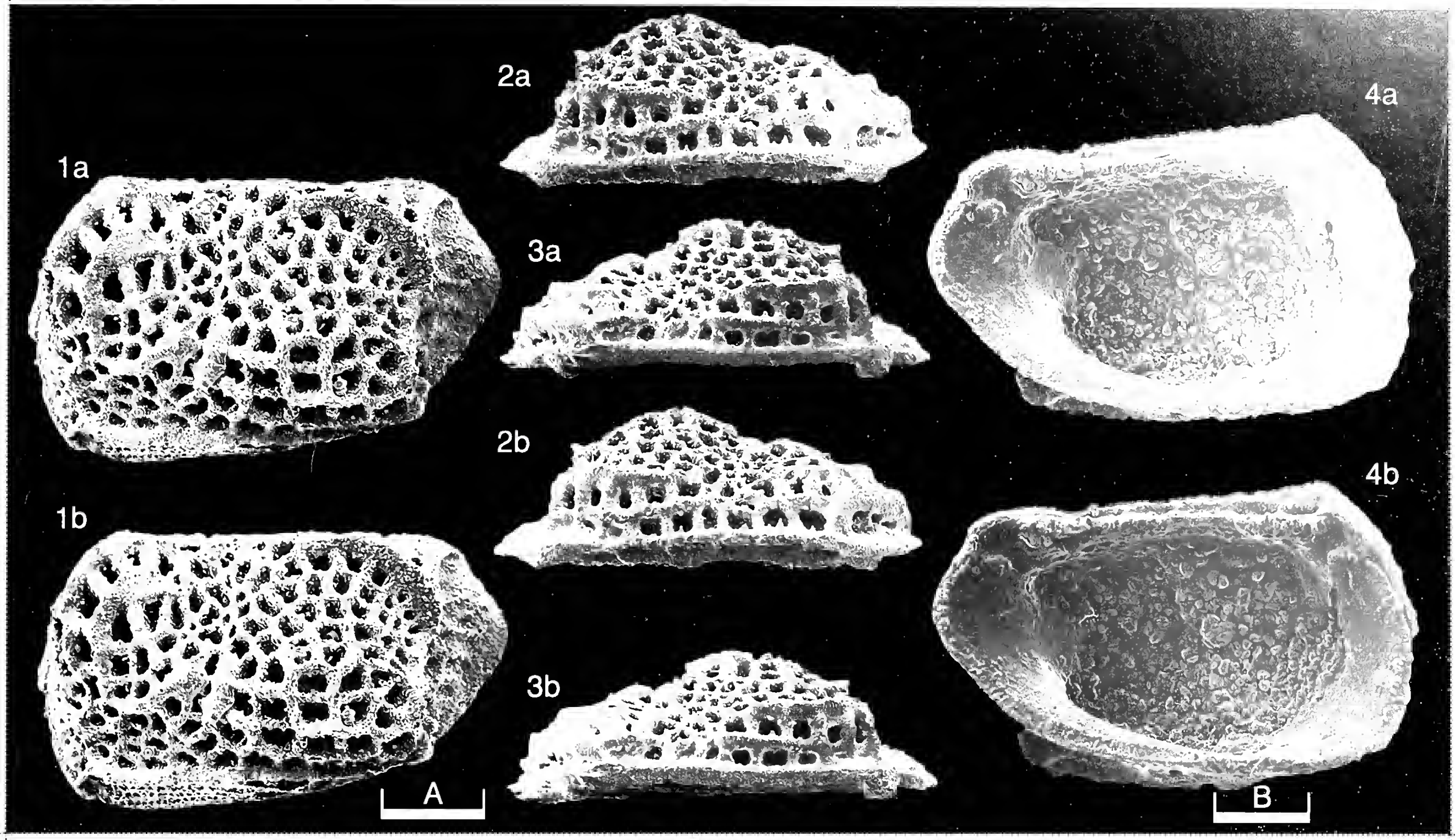
Diagnosis: A small, reticulate species of *Eucytherura* with distinct anterodorsal, posterodorsal and ventral flanges. The carapace is subquadrate in lateral view, dorsal, and ventral margins converge slightly posteriorly. Anterior margin broadly rounded, posterior margin subtriangular. Greatest height at anterior cardinal angle, greatest width just above midheight. The anterodorsal region bears two short subparallel flanges with a third present posterodorsally. The lateral and dorsal reticulae are regular and subrectangular, the posteroventral reticulae are raised to form a box-like structure. Ventral margin bears microreticulation with fine longitudinal ribs. The species is apparently blind. The inner lamella is broad, no vestibule observed, the inner margin of the posterior lamella is notable as it bears a forward projecting flexure (Pl. **23**, 14, fig. 4; Pl. **23**, 16, figs. 4, 5). Hinge antimerodont with coarse crenulae on median element (Pl. **23**, 16, fig. 2). Muscle scars not observed.

Remarks: The species bears similarities to a number of taxa described from the Upper Cretaceous of Western Australia (*E. antipodum*, Neale, J.W. *Spec. Pap. Palaeont.* **16**, 1–82, 1975), Cainozoic of the North Atlantic (*E. pseudoantipodum* Coles. G. and Whatley, R., *Revta esp. Micropaleont.*, **21**, 81–124, 1989) and the Cainozoic of the SW Pacific and Indian Ocean (*E.* aff. *antipodum, E. pseudoantipodum*, Ayress, M.A. *et al., Rec. Aust. Mus.*, **47**, 203–223, 1995). The present species differs from the aforementioned taxa in possessing square, open reticulae, a marked posterodorsal crescentic rib and in the forward flexure of the posterior lamella.

Distribution: Known only from the type locality.

Explanation of Plate 23, 16

Figs 1, 2, 5, LV (holotype, **OS 14896**, 290 μm long): fig. 1, vent.; fig. 2, int. hinge detail; fig. 5, int. detail of posterior lamella. Figs. 3, 4, RV (paratype, **OS 14897**, 290 μm long): fig. 3, ext. lat.; fig. 4, int. lat.
Scale A (100 μm; ×200), figs 1, 3, 4; scale B (50 μm; ×370), fig. 2; scale C (10 μm; ×625), fig. 5.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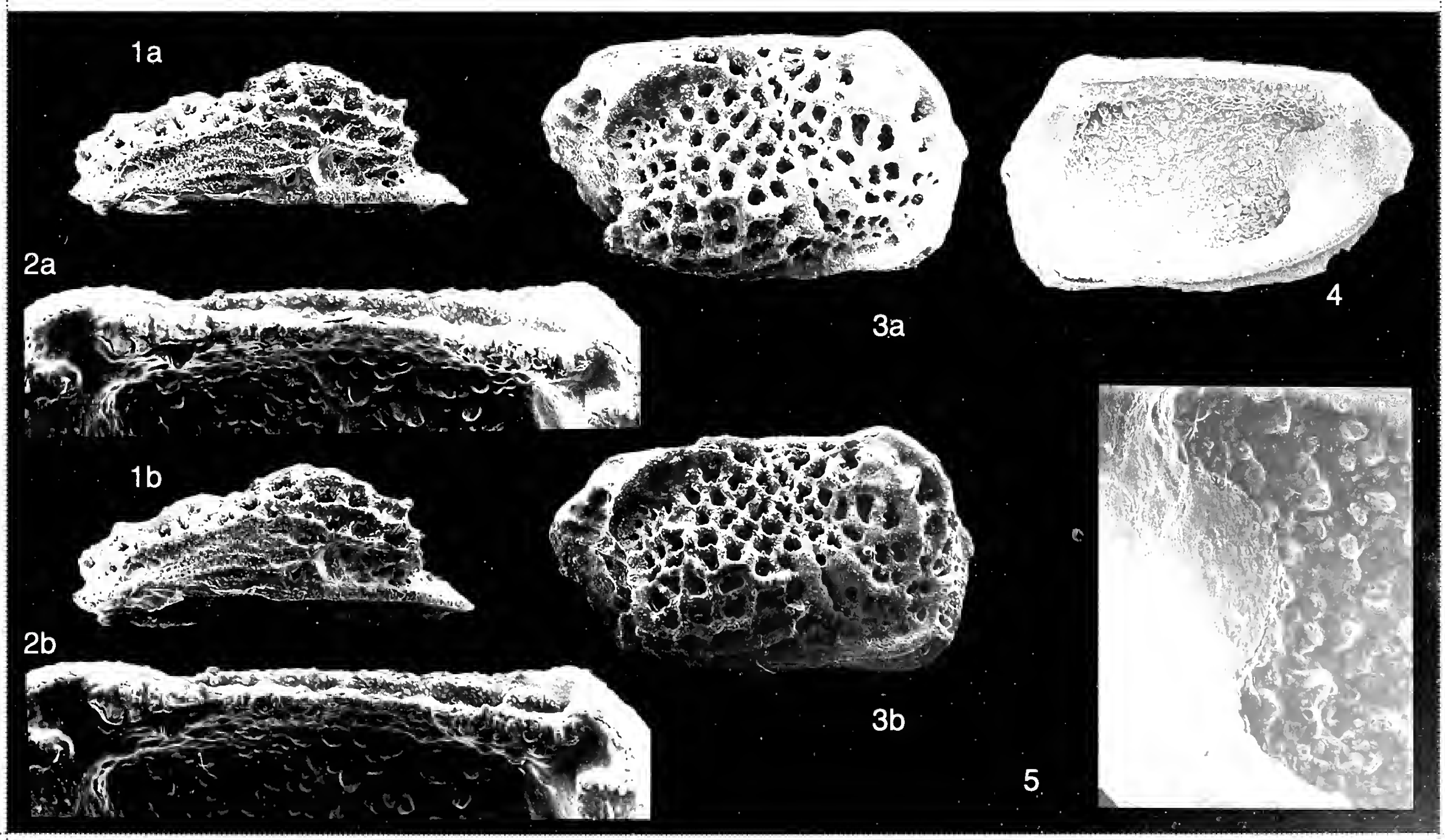
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ON *SCEPTICOCYTHEREIS SANCTIVINCENTIS* MAJORAN sp. nov.

by Stefan Majoran
(Department of Marine Geology, Göteborg University, Sweden)

Scepticocythereis sanctivincentis sp. nov.

1993 "*Cythereis*" sp., K.G. McKenzie, R.A. Reyment and E.R. Reyment, *Revta esp. Paleont.*, **8**, 106, pl. 6, fig. 9.

Holotype: South Australian Museum, Adelaide, Australia no. **SAM P35501**; Female LV.

Type locality: Type section of the Blanche Point Formation, near Willunga, South Australia (lat. 35° 15′ S, long. 138° 24′ E). Late Eocene, Priabonian. Holotype collected 1.3 m above the base of the Gull Rock Member (dated by planktonic foraminifera as P16, see McGowran *et al.*, 1992 *in*: D.R. Prothero and W.A. Berggren (Eds.), *Eocene-Oligocene Climatic and Biotic Evolution*, Princeton University Press, 178–201).

Derivation of name: After the provenance of the holotype in the St. Vincent Basin, South Australia.

Figured specimens: South Australian Museum, Adelaide, Australia, nos **SAM P35501** (holotype, female LV: Pl. **23**, 18, fig. 1), **SAM P35502** (female car.: Pl. **23**, 18, fig. 2), **SAM P35503** (male RV: Pl. **23**, 18, fig. 3), **SAM P35504** (male RV: Pl. **23**, 20, fig. 1), **SAM P35505** (female car.: Pl. **23**, 20, fig. 2), **SAM P35506** (male LV: Pl. **23**, 20, fig. 3), All specimens from the Gull Rock Member of the Blanche Point Formation.

Explanation of Plate 23, 18

Fig. 1, Female LV, ext. lat. (holotype, **SAM P35501**, 1000 μm long). Fig. 2, Female car., ext. dors. (**SAM P35502**, 990 μm long). Fig. 3, Male RV, ext. lat. (**SAM P35503**, 1150 μm long).
Scale A (200 μm; ×70), figs. 1–3.

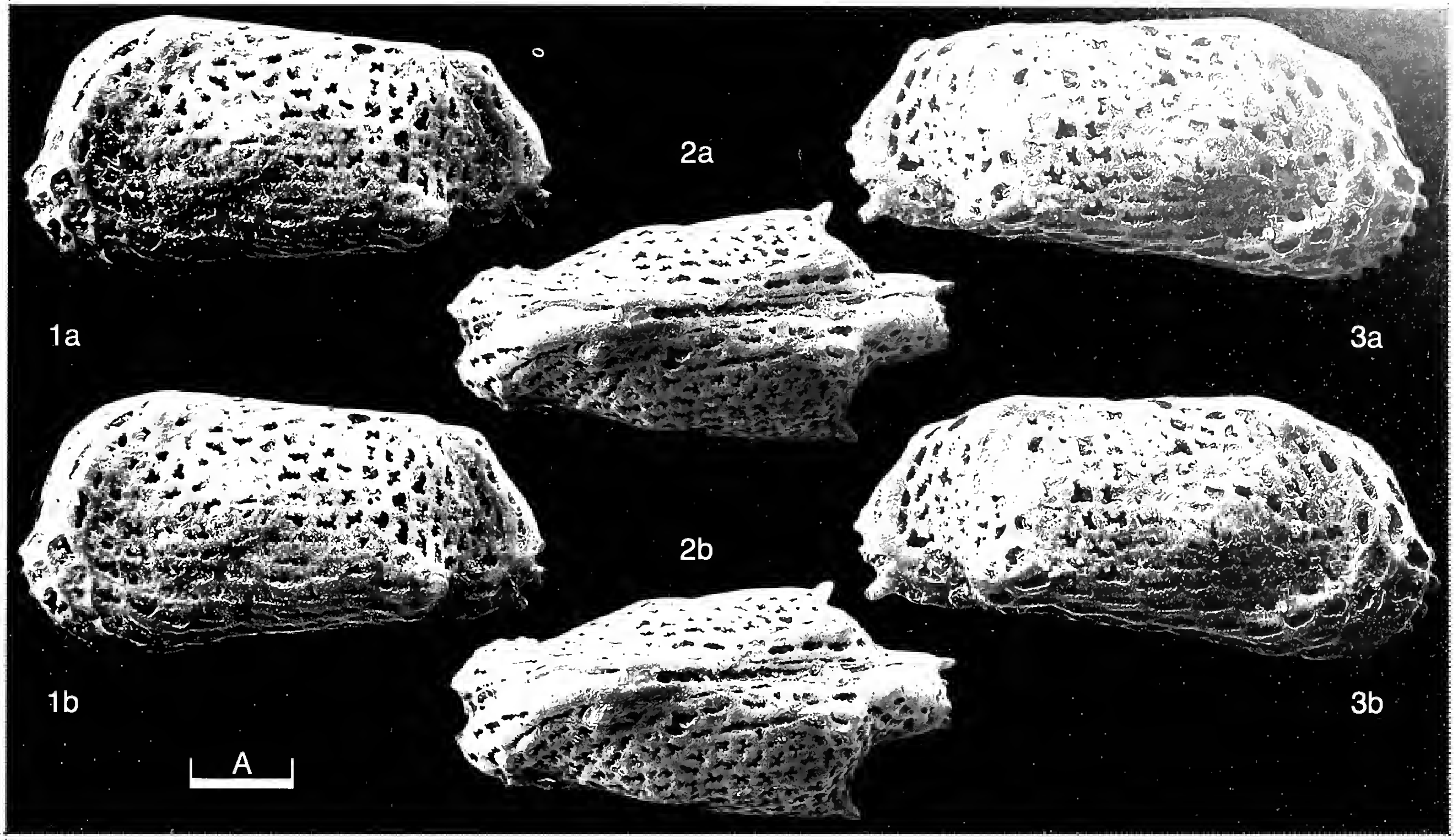
Diagnosis: A species of *Scepticocythereis* with a conspicuously inflated anterior margin being particularly prominent along its ventral part. Carapace subrectangular in lateral view, subhastate in dorsal view. Inequivalved as the left valve overreaches the right antero- and posterodorsally. Entire surface reticulate and characterised by small inwards facing mural spines extending into the fossae. Fossae more elongate in the marginal regions compared to the central region. Reticulate surface disrupted by a spiny posteroventral projection. Ventral section of anterior and posterior margins bears stout spines. Eye-tubercle large. Sexual dimorphism prominent. Right hinge with a crenulate anterior tooth, faintly crenulate posteromedian furrow and a bilobate posterior tooth; left hinge complementary. Muscle-scars with a V-shaped frontal scare and four adductors in a subvertical series.

Remarks: The external and internal morphology of the new species is very similar to the Upper Cretaceous type-species *S. ornata* (see Bate, R.H., *Spec. Pap. Palaeont*, **10**, 67–70, pl. 26, figs. 1–8, pl. 27, figs. 11–12, text-figs. 37A–F, 1972; and Neale, J.W. *Spec. Pap. Palaeont*, **16**, 61–62, pl. 2, fig. 10, pl. 21, fig. 4, text-figs. 12d, f, h., 1975) from Western Australia. This only concerns the shape of the frontal muscle-scar. It is clearly V-shaped in the present material but was described as "oval or slightly crescentic" (see Bate, 1972, *op. cit.*; and Neale., 1975, *op. cit.*). Majoran (*GFF* **117**, 80 appendix, 1995; *Revta esp. Paleont.*, **11**, 33–34, appendices, 1996) provisionally named this species *Cletocythereis* sp.

Distribution: Presently known from the Tortachilla Limestone and the Tuketja, Gull Rock and Perkana Members of the Blanche Point Formation, South Australia (Late Eocene, Priabonian, Zones P15–P16, see McGowran *et al.*, 1992 *in*: D.R. Protero and W.A. Berggren (Eds.), *op. cit.*). Also, from the Browns Creek Clays at Browns Creek, Victoria (Late Eocene, see McKenzie *et al.*, 1993, *op. cit.*).

Explanation of Plate 23, 20

Fig. 1, Male RV, int. lat. (**SAM P35504**, 1080 μm long). Fig. 2, Female car., ext. vent. (**SAM P35505**, 970 μm long). Fig. 3, Male LV, int. lat. (**SAM P35506**, 1060 μm long).
Scale A (200 μm; ×70), figs, 1–3.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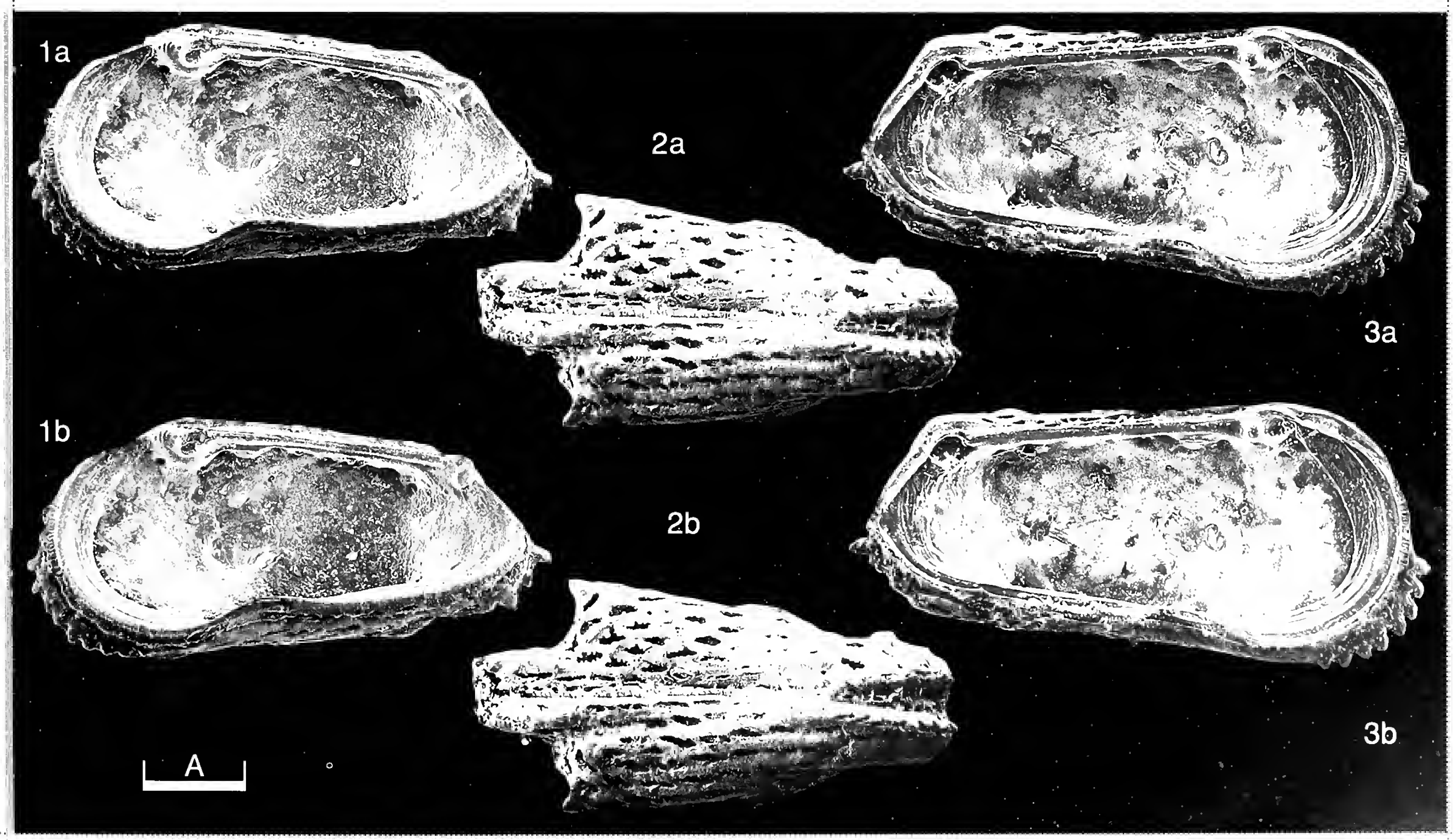
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ON *SCHIZOCYTHERE INEXPECTA* McKENZIE, REYMENT & REYMENT

by Stefan Majoran
(Department of Marine Geology, Göteborg University, Sweden)

Schizocythere inexpecta McKenzie, Reyment and Reyment, 1991

1991 *Schizocythere inexpecta* sp. nov., K.G. McKenzie, R.A. Reyment and E.R. Reyment, *Revta. esp. Paleont.*, **6**, 149, pl. 3, fig. 13.

Holotype: Institute of Earth Sciences, Palaeontology, Uppsala Univeristy, Uppsala, Sweden, no. **PAM.Au.234;** Male LV.

Type locality: Bells Headland, Victoria, Australia; approx. lat. 38° 24′ S, long. 144° 6′ E. Dated as Lower Oligocene (Janjukian) by McKenzie *et al.* (*op. cit.*).

Figured specimens: Department of Marine Geology, Göteborg University, Sweden, nos. **DMGUG.Au.130** (male LV: Pl. **23**, 22, fig. 1), **DMGUG.Au.131** (female LV: Pl. **23**, 22, fig. 2). **DMGUG.Au.132** (male RV: Pl. **23**, 22, fig. 3), **DMGUG.Au.133** (male RV: Pl. **23**, 24, fig. 1), **DMGUG.Au.134** (female car.: Pl. **23**, 24, fig. 2), **DMGUG.Au.135** (female LV: Pl. **23**, 24, Fig. 3). All specimens from the Ruwarung Member of the Port Willunga Formation, Lower Oligocene.

Explanation of Plate 23, 22

Fig. 1, Male LV, ext. lat. (**DMGUG.Au.130**, 540 μm long). Fig. 2, Female LV, ext. lat. (**DMGUG.Au.131**, 520 μm long). Fig. 3, Male RV, ext. lat. (**DMGUG. Au.132**, 560 μm long).
Scale A (100 μm; ×120), figs. 1–3.

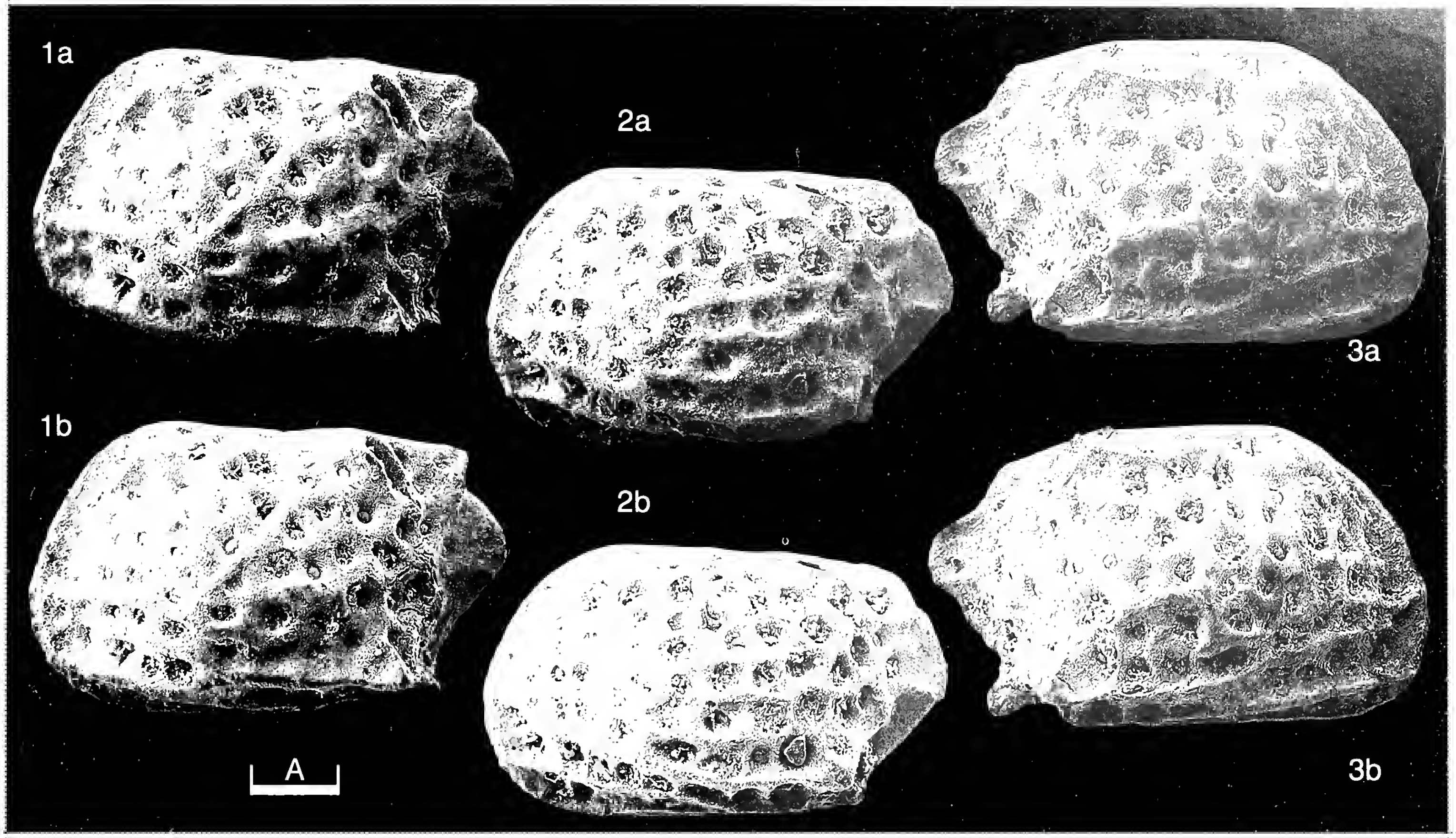
Diagnosis: Carapace subrectangular in lateral view, subovate in dorsal view with subacuminate posterior margin. Caudal process slightly above mid-height. Ornament evenly reticulate with strongly developed muri and rather deep rounded fossae which are largest in the ventral region. Dorsal ridge almost completely suppressed, ventral ridge more distinctly developed but relatively thin. Sexual dimorphism prominent. The presumed males are somewhat larger in size than the females displaying a more distinct posterodorsal disruption of the ornament and a more distinct projection of the posterior cardinal angle in the left valve. Two posteroventral projections of the surface ornament are discernible in both valves, the ventral one being more strongly developed in male right valves. Internal features as for genus.

Remarks: This species is common in the Port Willunga Formation, South Australia, and was identified after examining the types of *Schizocythere inexpecta* McKenzie, Reyment and Reyment, which was the first record of *Schizocythere* in Australia. McKenzie *et al.* (*op. cit.*) only illustrated an external view of the holotype. The following observations are added to the type description. The more numerous representatives of the Port Willunga Formation exhibit sexual dimorphism, referred to above. The posteroventral projections differentiate this species from other members of the genus. Although McKenzie *et. al.* (*op. cit.*) believed the holotype to be female, in the present authors opinion the specimen is male.

Distribution: Presently known from Bells Headland, Victoria (Janjukian, Lower Oligocene) and from the Aldinga and Ruwarung Members of the Port Willunga Formation, South Australia (Zones P18–P21, Rupelian, Lower Oligocene, McGowran *et al.*, *in*: D.R. Prothero and W.A. Berggren (Eds.), *Eocene–Oligocene Climatic and Biotic Evolution*, Princeton University Press, 178–201, 1992).

Explanation of Plate 23, 24

Fig. 1, Male RV, int. lat. (**DMGUG.Au.133**, 560 μm long). Fig. 2, Female car., ext. dors. **DMGUG.Au.134**, 500 μm long). Fig. 3, Female LV, int. lat. (**DMGUG.Au.135**, 500 μm long).
Scale A (110 μm; ×120), figs. 1–3.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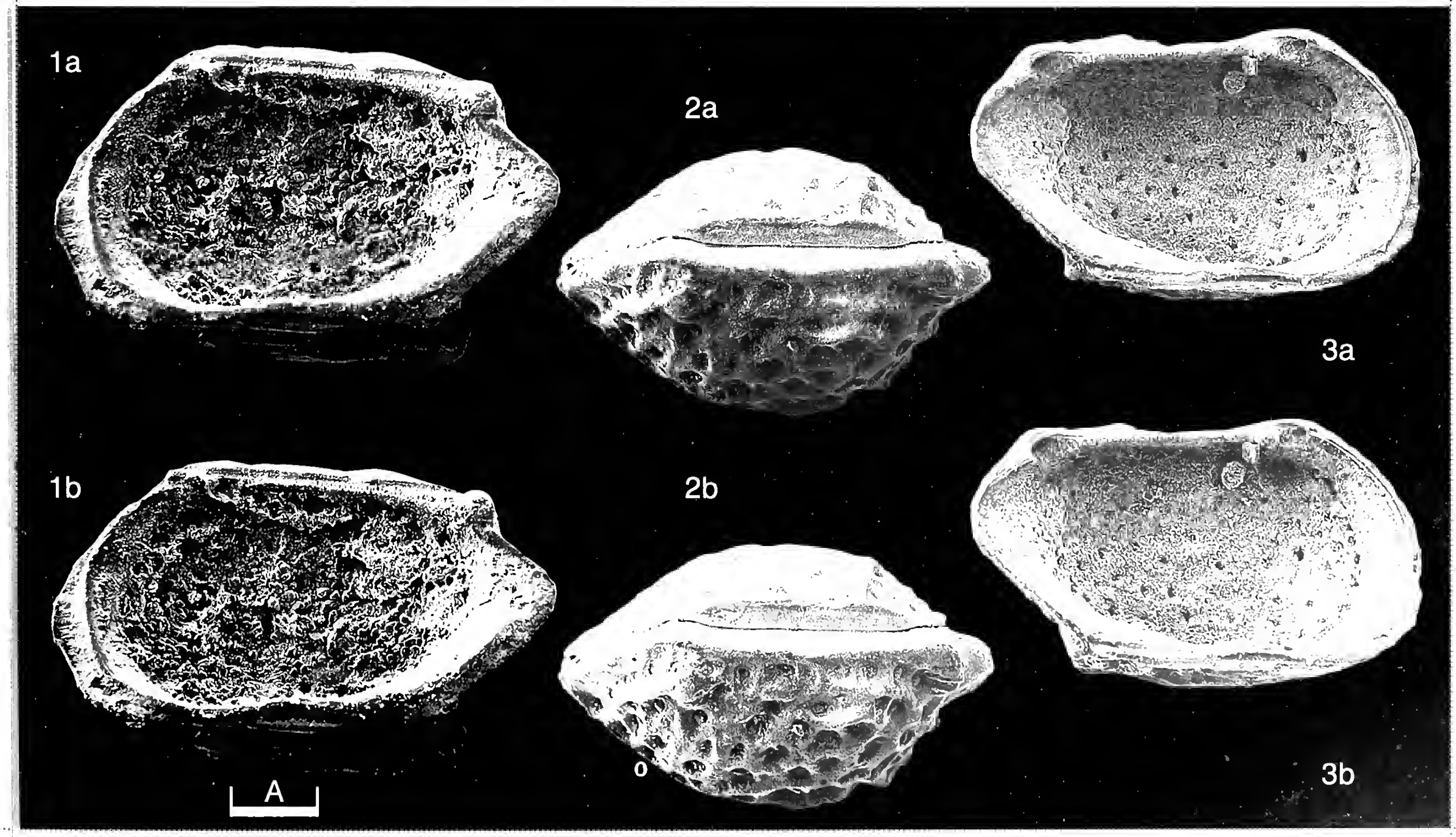
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ON *ECHINOCYTHEREIS LECKWIJCKI* WOUTERS sp. nov.

by Karel Wouters
(Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Echinocythereis leckwijcki sp. nov.

1978 *Cythere Wetherelli*, Jones; G.S. Brady, *Trans. zool. Soc. Lond.*, **10**, 390, pl. 64, figs. 7a–7d (*non* Jones, 1856).
1918 *Cythereis Wetherellii* Brady; W.N. Kuiper, *Oligocäne und Miocäne Ostracoden aus den Niederlanden*, 66–67, pl. 3, figs. 28a–28c (*non* Jones, 1856).
1981 *Echinocythereis variolata* (Egger, 1859) s.l.; H. Uffenorde, *Palaeontographica*, **A172**, 156, pl. 2, figs. 13, 16 (*non* Egger, 1859).

Holotype: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium, no. **TCTI 6265**; female LV [Paratypes nos. **TCTI 6266–6270, 6291, 6292**].

Type locality: S.W. Antwerp, Belgium, near the entrance to the railroad tunnel under the River Scheldt (long. 4° 22′ 35″ E, lat. 51° 12′ 14″ N). Edegem Sand Member, Lower Miocene.

Figured specimens: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (KBIN) nos. **TCTI 6265** (holotype, female LV: Pl. **23**, 26, fig. 1), **TCTI 6266** (paratype, female RV: Pl. **23**, 26, fig. 2), **TCTI 6267** (paratype, male LV; Pl. **23**, 26, fig. 3), **TCTI 6268** (paratype, male RV: Pl. **23**, 26, fig. 4), **TCTI 6269** (paratype, female LV: Pl. **23**, 28, fig. 1), **TCTI 6270** (paratype, male RV: Pl. **23**, 28, fig. 2), **TCTI 6291**(paratype, female car.: Pl. **23**, 28, fig. 3). All specimens from type locality and horizon.

Derivation of name: In honour of the late Prof. W.P. Van Leckwijck (1902–1975).

Explanation of Plate 23, 26

Fig. 1, female LV, ext. lat. (holotype, **TCTI 6265**, 1042 μm long). Fig. 2, female RV, ext. lat. (paratype, **TCTI 6266**, 1090 μm long). Fig. 3, male LV, ext. lat. (paratype, **TCTI 6267**, 1060 μm long). Fig. 4, male RV, ext. lat. (paratype, **TCTI 6268**, 1087 μm long). Scale A (250 μm; ×56) figs. 1–54.

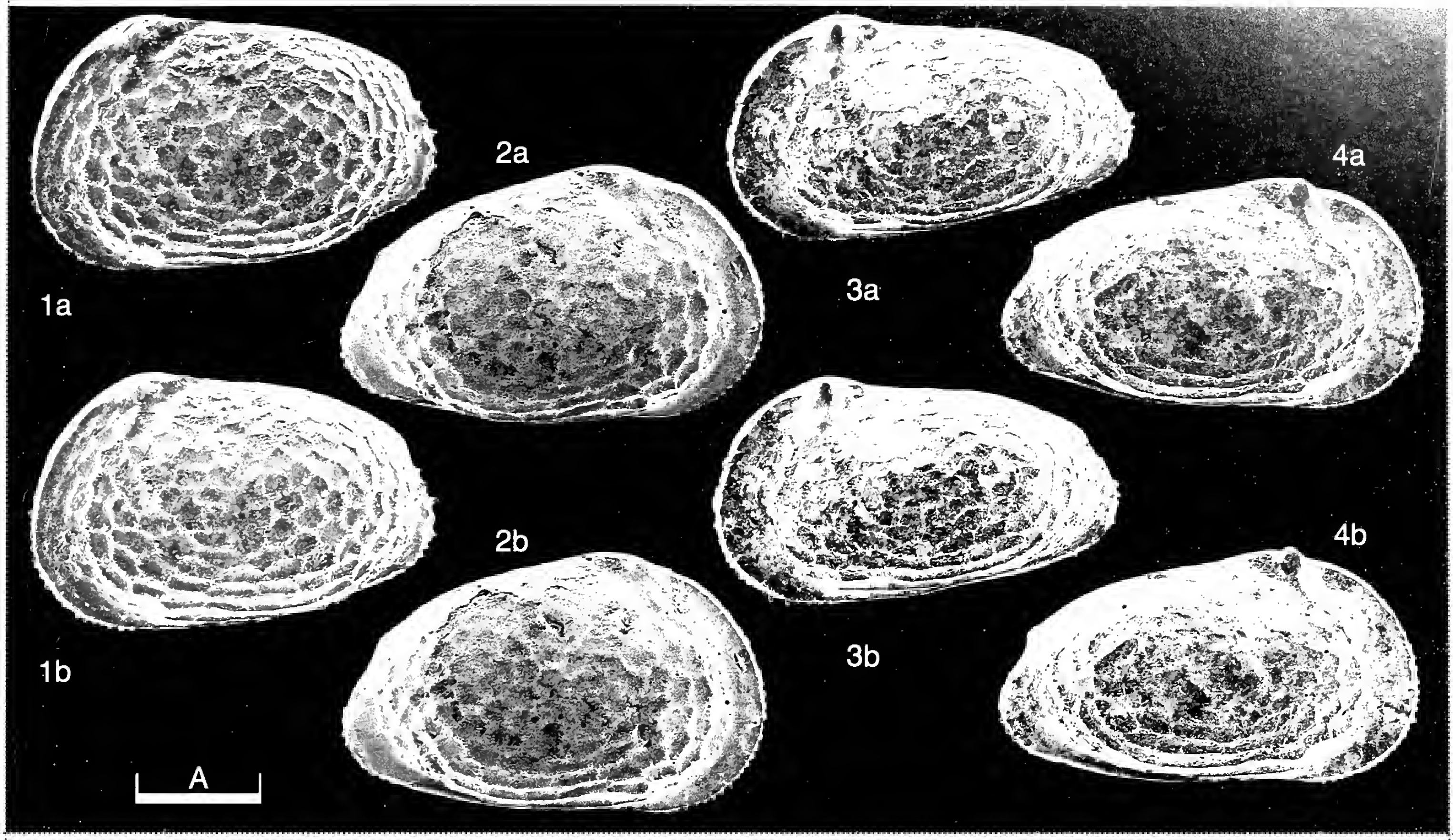
Diagnosis: A species of *Echinocythereis* with inflated valves bearing faint polygonal reticulation; muri bearing very short, blunt spines; anterolateral region unornamented but bearing a weak submarginal rib.

Remarks: *Echinocythereis leckwijcki* sp. nov. resembles *E. subcornuta* (Lienenklaus, 1900). The latter species, however, is distinguished by a ventro-lateral ridge consisting of small denticles and a stout postero-lateral spine. Furthermore, the weakly developed submarginal ridge is set with small spines. *E. variolata* (Egger, 1858) differs from the new species in being more oblong in lateral view, and in having only weakly inflated valves in dorsal view. The muri of the reticulum are markedly thicker. Although there is an overall resemblance. *E. variolata* and *E. leckwijcki* sp. nov. (= *Cythere wetherelli* Jones *sensu* Brady, *non* Jones) are not synonymous as supposed by Witt (1967, *Geol. Bavar.*, **57**: 41–42). Eagar (1965, *Rev. Micropaléont.*, **8**: 20) assigned *Cythere wetherelli* to *Cytheropteron* (*Eocytheropteron*), followed by Haskins (1970), *Rev. Micropaléont.*, **13**, 18, pl. 1, figs. 35–42). Species such as *E. scabra* (Muenster, 1830), *E. scabrella* (Lienenklaus, 1900), *E. lima* (Reuss, 1850) and *E. reticulatissima* Eagar, 1965, from the Tertiary of Europe, are more strongly ornamented. *E. semireticulata* (Haskins, 1971) is similar to the new species in shape, size and type of ornamentation but differs in that it possesses ventral and ventrolateral longitudinal striae. *E. jacksonensis* (Howe and Chambers, 1935) (see Hazel, J.E., Mumma, M.D. and Huff, W.J., *Trans. Gulf Coast Ass. Geol. Soc.*, **30**, pl. 1, fig. 10, 1980) from the Lower Oligocene of Mississippi and Alabama, is similar to the present species but differs by the presence of rows of spinules along the anteromarginal zone.

Distribution: Belgium: Lower and Middle Miocene (Edegem Sand Member at Antwerp, Lier, Terhagen, Wilrijk; Antwerpen Sand Member at Borderhout and Zonderschot Sand Member at Heist-op-den-Berg). The Netherlands: Middle Miocene (Liessel and Sevenum, Kuiper, 1918) and in the well at Haamstede (coll. Noordermeer). Germany: Upper Oligocene to Middle Miocene (several localities, Uffenorde, 1981).

Explanation of Plate 23, 28

Fig. 1, female LV, int. lat. (paratype, **TCTI 6269**, 1062 μm long). Fig. 2, male RV, int. lat. (paratype **TCTI 6270**, 1067 μm long). Fig. 3, female car., dors. (paratype, **TCTI 6291**, 1057 μm long).
Scale A (250 μm; ×56); figs. 1–3.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ON *ORIONINA CABOVERDENSIS* WOUTERS sp. nov.

by Karel Wouters
(Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, Belgium)

Orionina caboverdensis sp. nov.

1869 *Cythere finmarchica* (G.O. Sars); G.S. Brady, *in* De Folin and Périer, *Fonds de la mer*, p. 138 (*non* Sars, 1866).
1892 *Cythere finmarchica* (G.O. Sars); G.S. Brady and A.M. Norman, *Sc. Trans. Roy. Dublin Soc.*, **4**, ser. 2, p. 163.

Holotype: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, (KBIN) no. **OC 1779**, dissected male. (Paratypes nos. **OC 1780–OC 1790**; 7 dissected specimens, 75 adults and 15 juveniles preserved in alcohol.)

Type locality: Cape Verde Islands (Atlantic Ocean), São Vicente, Baia das Gatas, intertidal, on sand between boulders (collected by T. Backeljau, February 5th, 1996).

Derivation of name: With reference to the type locality.

Figured specimens: Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels, nos. **OC 1779** (holotype, male LV: Pl. **23**, 30, fig. 1, Text-figs. 1a, b, 2f), **OC 1780** (paratype, female LV: Pl. **23**, 30, fig. 2; female RV: Pl. **23**, 30, fig. 3, Text-fig. 1c), **OC 1784** (paratype, female RV: Pl. **23**, 32, fig. 1; female LV: Pl. **23**, 32, fig. 2), **OC 1787** (paratype, female car.: Pl. **23**, 32, fig. 3), **OC 1788** (paratype, male car.: Pl. **23**, 32, fig. 4), **OC 1789** (paratype, female LV, Text-fig. 1a), **OC 1782** (paratype, male appendages, dissection: Text-figs. 2a, b, e), **OC 1783** (paratype, male appendages, dissection: Text-fig. 2d), **OC 1785** (paratype, female appendages, dissection: Text-figs. 1a, b, d, 2c), **OC 1786** (paratype, female appendages, dissection: Text-figs. 1e, f). All specimens from the type locality.

Explanation of Plate 23, 30

Fig. 1, ♂ LV, ext. lat. (holotype, **OC 1779**, 500 μm long). Fig. 2, ♀ LV, ext. lat. (paratype, **OC 1780**, 510 μm long). Fig. 3, ♀ RV, ext. lat. (paratype, **OC 1780**, 510μm long).
Scale A (100 μm; ×110), figs. 1, 2, 3.

Diagnosis: A species of *Orionina* with weak ornamentation. Of the three longitudinal ridges, so prominent in the type species, only two are recognized in the present species. The posterior transverse rib is weakly developed, recticulation very faint with approximately ten knob-like protuberences in the antero-ventral area. Two frontal muscle scars are recorded, the ventral one sutured; sexual dimorphism pronounced.

Remarks: Most species of the genus *Orionina* are characterized by a number of strong ribs (in some species up to seven) with a well developed reticulation pattern. Bold (*J. Paleontol.*, **37**, 33–50, 1963), has noted that there is a wide range of variation, and that in some species only three ribs or weak striations and pitting are present. Such is the case in *Orionina caboverdensis* sp. nov., where the reticulation and the ridges are much reduced. Because of its weak ornamentation, *Orionina fragilis* Bold, 1963 from the Upper Miocene of Trinidad, is similar to the present species, however, the latter species differs, in possessing a more elongate lateral outline with less well developed longitudinal ridges and a more prominent posterior ridge. Although it is generally accepted that *Orionina* species have three frontal scars, *Orionina caboverdensis* sp. nov. has only two, the ventral frontal scar being sutured. In some specimens this suture is very indistinct whereas in others it is clearly visible, and can give the impression that three scars are present.

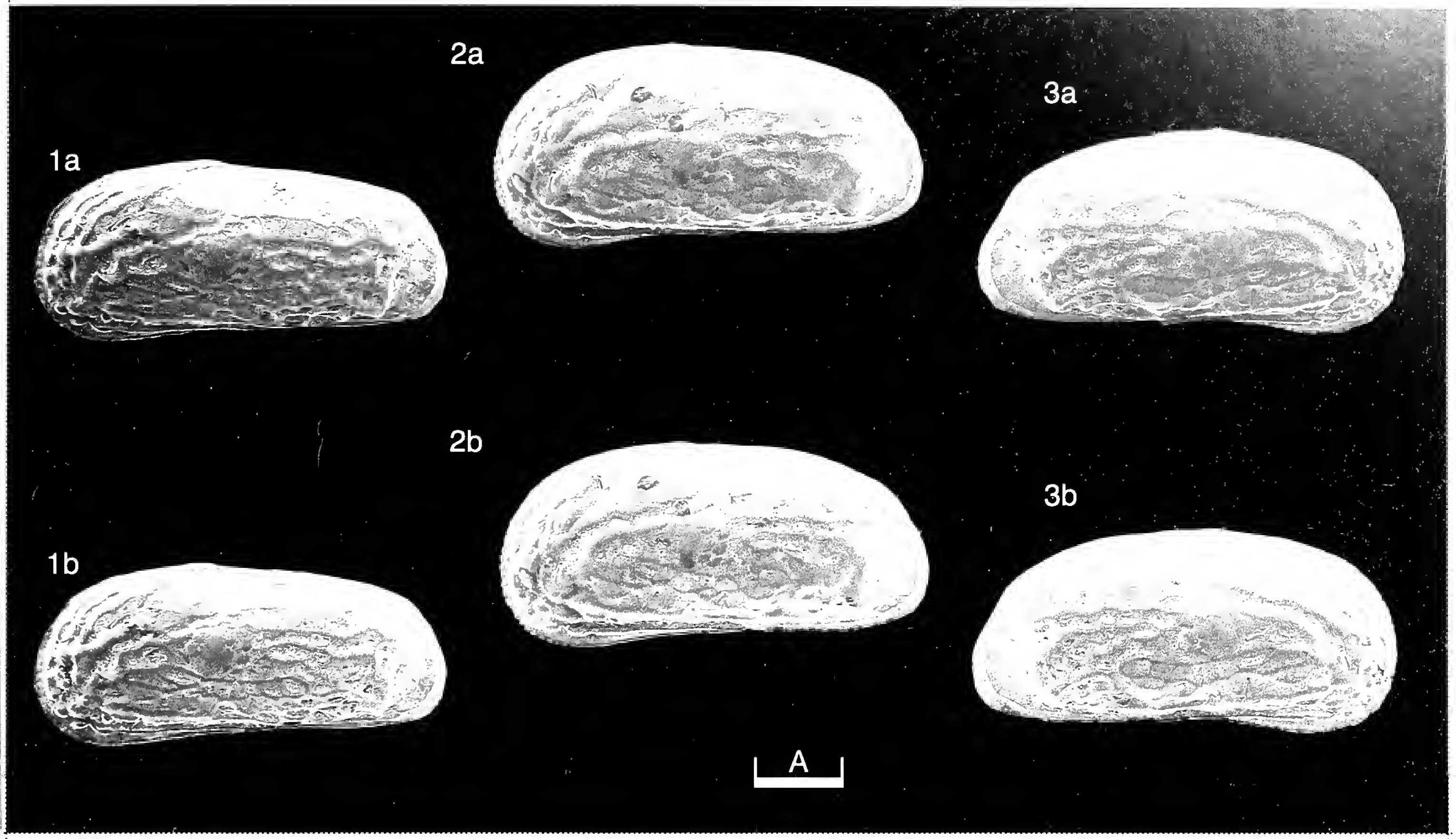
The new species may be confused with *Finmarchinella finmarchica* (Sars, 1866) because of the strking external similarity between the two. However, observations on the morphology of the inner lamella (with pillar structures) and the nature of the marginal pore canals clearly identified the new species as belonging to the genus *Orionina*. Hazel (*Geol. Surv. Prof. Pap.*, **564**, p. 19, 1967) stressed that records of *F. finmarchica* in the Cape Verde Islands were inconsistent with other occurrences of the genus and, thus considered them to be misidentified, a point of view which was followed by Neale (*Bull. Br. Mus. nat. Hist. Zool.*, **27**: p. 85, 1974).

Distribution: The new species is known only from the type locality, having been previously recorded from St. Vincent (Cape Verde Islands) by Brady (1869), *op. cit.*) and Brady and Norman (1892, *op. cit.*) as *Cythere finmarchica*. At the type locatity the species occurs together with living populations of *Kotoracythere inconspicua* (Brady, 1880) and *Keija demissa* (Brady, 1868). This is the first record of the genus *Orionina* in the Eastern Atlantic. The new species may well be endemic to the islands, since it was not found by Witte (*Verh. Kon. Ned. Akad. Wet. Afd. Natuurk.*, **39**: 1–84, 1993) in his extennsive study on ostracods from Senegal and the Gambia (620 km east of the Cape Verde Islands).

Acknowledgement: I wish to thank my colleague Dr. Thierry Backeljau (Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels) who collected the material.

Explanation of Plate 23, 32

Fig. 1, ♀ RV, int. lat. (paratype, **OC 1784**, 530 μm long). Fig. 2, ♀ LV, int. lat. (paratype, **OC 1784**, 530 μm long). Fig. 3, ♀ car. dors. (paratype, **OC 1787**, 540 μm long). Fig. 4, ♂ car. dors. (paratype, **OC 1788**, 520 μm long).
Scale A (100 μm; ×110), figs. 1, 2, 3.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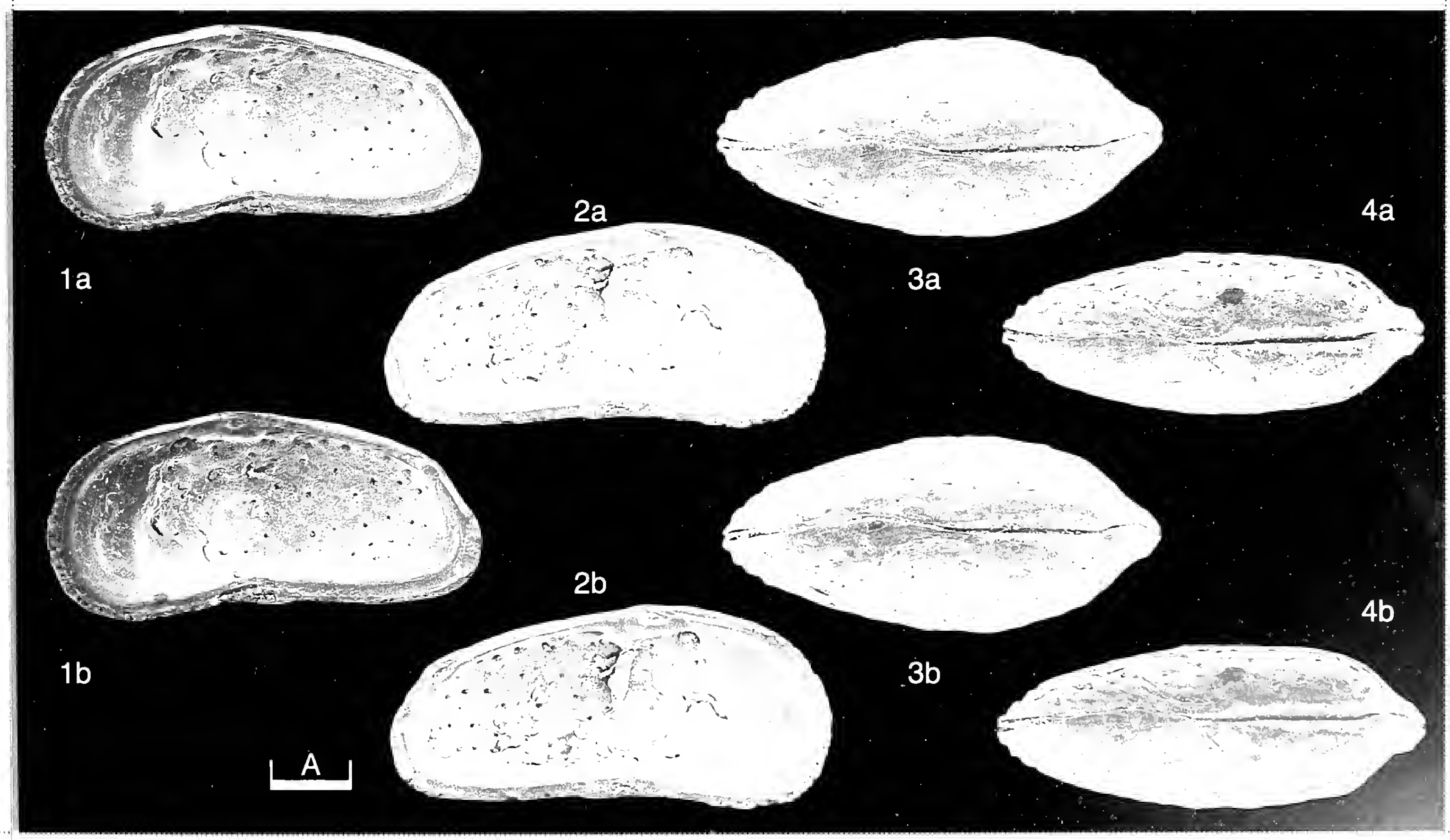
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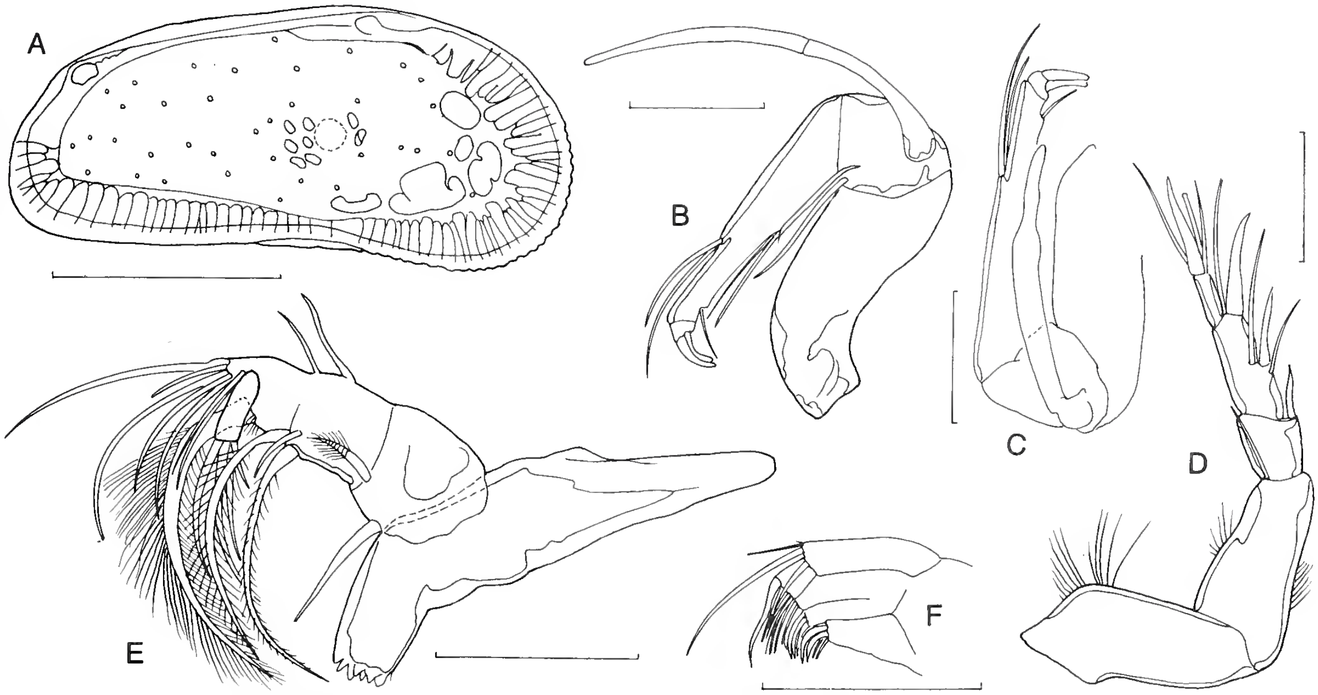
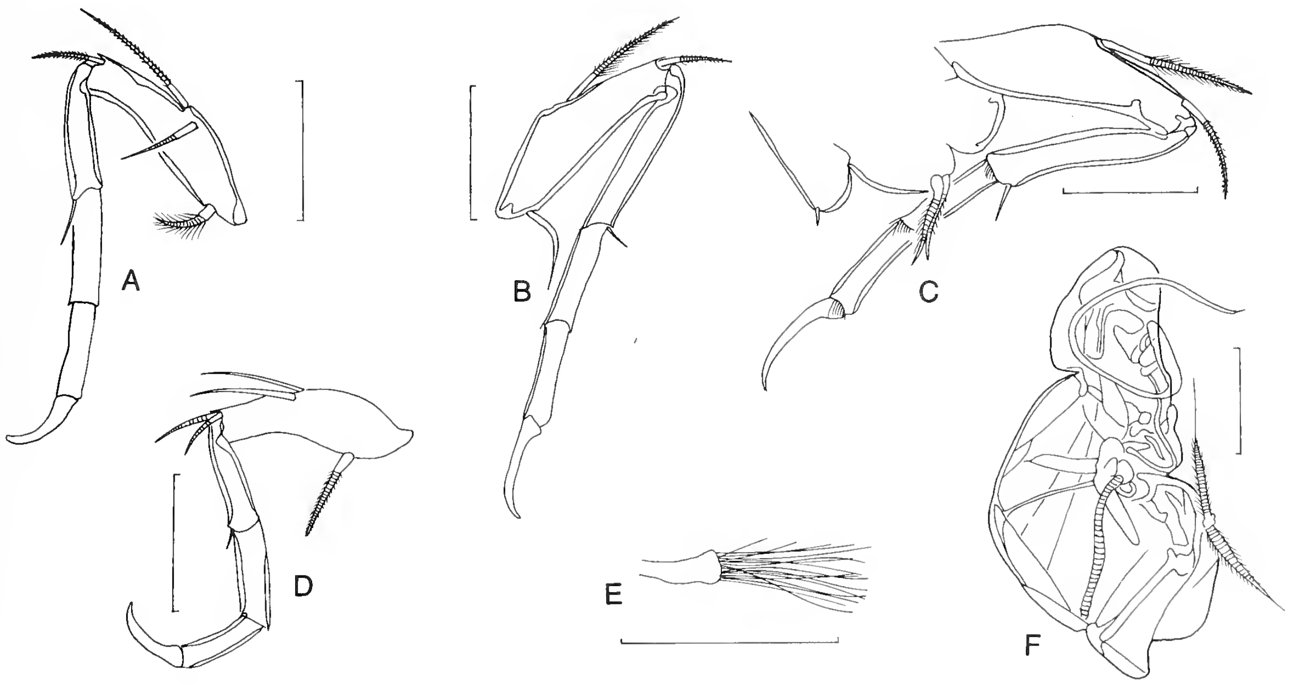


Text-fig. 1a. ♀ LV int. lat. (paratype, **OC 1789**, 525 μm long); 1b, ♂ antenna (holotype, **OC 1779**); 1c, ♀ antenna (paratype, **OC 1780**);1d, ♂ antennule (holotype, **OC 1779**); 1e, ♀ mandibule (paratype, **OC 1786**). 1f, ♀ maxillule (paratype, **OC 1786**). Scales, fig. 1a: 200 μm, figs. 1b-f: 50 μm.



Text-fig. 2a. ♂ 2nd leg (paratype, **OC 1782**), 2b, ♂ 3rd leg (paratype, **OC 1782**); 2c, ♀ 3rd leg and abdominal extremity (paratype, **OC 1785**); 2d, ♂ 1st leg (paratype, **OC 1783**); 2e, ♂ brush-like organ (paratype, **OC 1782**); 2f ♂ copulatory organ (holotype, **OC 1779**). All scales 50 μm.

Stereo-Atlas of Ostracod Shells 23 (9) 35–40 (**1996**)
595.337.13 (119.9) (84.164 : 069.17) : 551.312

ON *DARWINULA INCAE* DELACHAUX

by Giampaolo Rossetti, Koen Martens and Philippe Mourguiart
(Department of Environmental Sciences, University of Parma, 43100 Parma, Italy, Royal Belgian Institute of Natural Sciences, Vautierstraat 29, 1000 Brussels, Belgium and ORSTOM, 213 rue La Fayette, 75480 Paris, France)

Darwinula incae Delachaux

1928 *Darwinula incae* sp. nov., T. Delachaux, *Bull. Soc. neuch. Sc. nat.*, **1**, 54–56, pl. 5, figs. 28–39.

Holotype: Repository unknown. One adult decalcified female with the following measurements: L = 0.87 mm, H = 0.4 mm. See orginal description by Delachaux (*op. cit.*).

Type locality: Lake Huaron (Region of Huancavelica, Department of Junin, Peru) (lat. 13° 23′ S, long. 72° 15′ W).

Figured specimens: Royal Belgian Institute of Natural Sciences (Brussels, Belgium), Ostracod Collection, nos. **OC 1791** (♀ car.: Pl. **23**, 36, fig. 1), **OC 1792** (♀ car.: Pl. **23**, 36, fig. 2), **OC 1793** (♀ car.: Pl. **23**, 36, fig. 3), **OC 1794** (♀ RV and LV + appendages: Pl. **23**, 38, figs. 1–4; Text-figs. 1A, 1B, 1D, 2A, 2C), **OC 1795** (♀ appendages: Text-figs. 1C, 2D, 2E), **OC 1796** (♀ appendages: Text-figs. 1E, 2B).

All specimens collected on July 7, 1995 from Laguna "Guaqui," Bolivia (3810 m a.s.l., approx. lat. 16° 30′ S, long. 68° 48′ W). Shallow pool and canal in largely dry Laguna, turbid, many algae, c. 10 cm deep, c. 150 × 50 m large; water temperature = 15.2 °C, pH = 9.3, conductivity = 767 μS/cm, dissolved oxygen concentration = 9.2 mg/l.

Diagnosis: Large-sized Darwinulid. Valves unequal, left overlapping the right on all sides. Shell with smooth surface. Seen dorsally, carapace ovoid in outline, posterior extremity broadly rounded, anterior rather convex. In lateral view, both ends rounded, anterior narrower than posterior; ventral margin almost straight, dorsal broadly arched. Central muscle scars consisting of 13–14 small spots arranged in a nearly circular rosette. Postero-ventral keel on right valve and internal teeth in left valve absent.

Explanation of Plate 23, 36

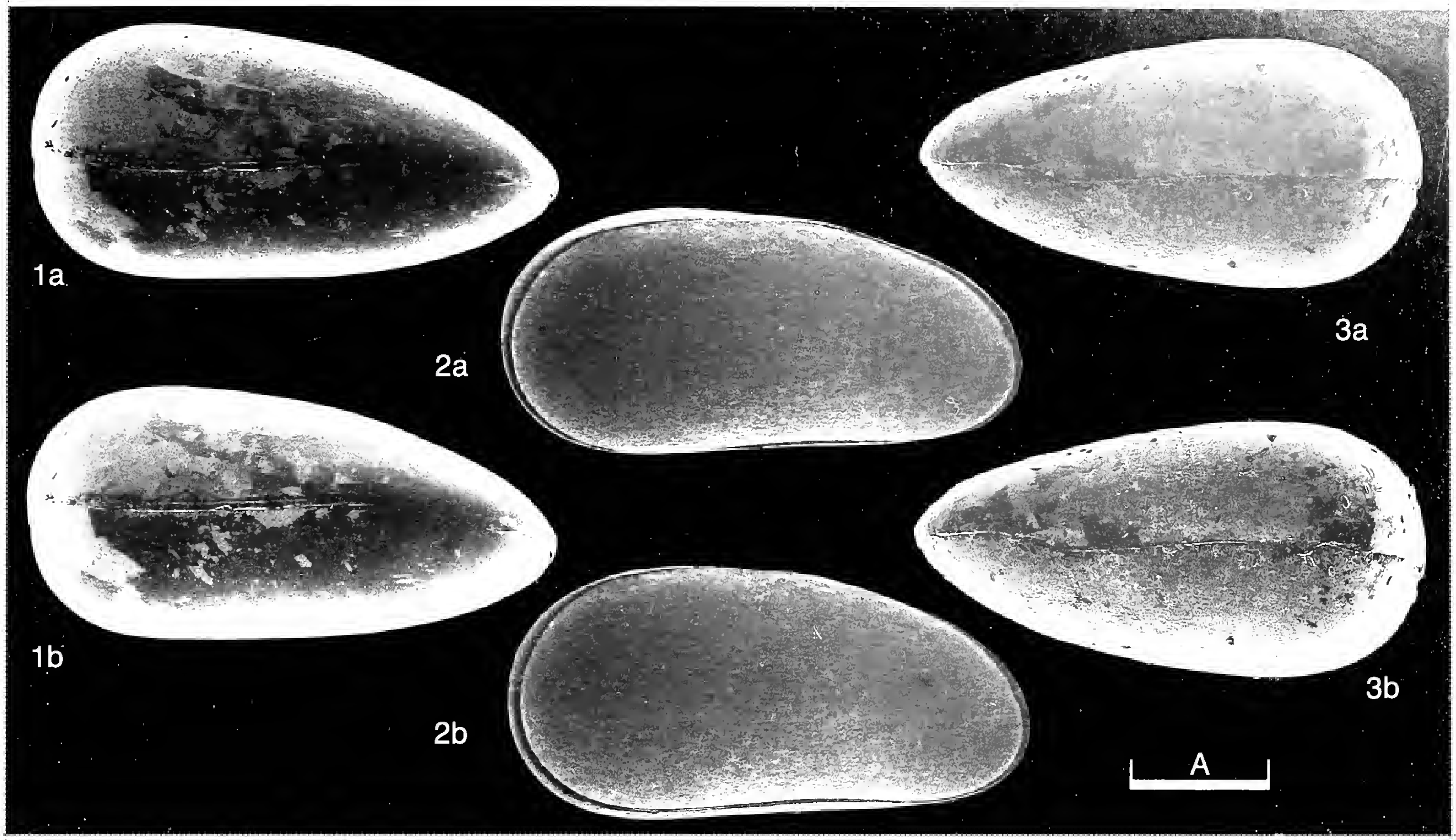
Fig. 1, female car., dors. (**OC 1791**, 804 μm long); fig. 2, female car., lat. (**OC 1792**, 788 μm long); fig. 3, female car., vent. (**OC 1793**, 772 μm long).
Scale A (200 μm; ×120), figs. 1–3.

Exopodite of antenna with bristles *a* and *b* (text-fig. 1A) of equal length, reaching the distal extremity of the third article of the endopodite. Second segment of mandibular palp bearing in distal position two long setae (*y* and *z*) and two shorter setae (*w* and *y*), the latter not exceeding the next segment (text-fig. 2A); distal margin of third segment with 5 claws of different lengths, two external setae (*a* and *b*) and one smaller internal setae *c*, the latter half as long as the former two (text-fig. 2A). Second segment of the maxillar endopodite with only one setae *a* (text-fig. 2B). Furcae present as two long setae. Male unknown.

Remarks: The original description of *Darwinula incae* was based on only one decalified specimen. This implies an unsatisfactory representation of the valve shape; moreover, a complete description of the appendages is lacking. No further descriptions of *D. incae* are available up to the present. *Darwinula* specimens from Laguna Guaqui are attributed to *D. incae* because of the great similarity with the original description in several diagnostic details of the appendages, which are not shared with any other living species of this genus. Our specimens are smaller than the holotype, but still larger than any other Recent *Darwinula* species. There are 25 described Recent species in the genus *Darwinula*, which can roughly be divided into two main groups: the *D. stevensoni* group, with RV overlapping LV on all sides, and the *D. africana* group, with LV overlapping the RV. This subdivision is not absolute, as the position of at least *D. serricaudata*, with *stevensoni*-like morphology, but with LV overlapping RV, remains at present ill understood. The second lineage can effectively be divided again into several sublineages (see D. Danielopol, *Bijdr. Dierk.* **50**(2), 243–291, 1980), but these groupings will be reassessed elsewhere (Rossetti and Martens, in prep.). *Darwinula incae* clearly belongs in the second lineage, but due to its exceptionally large size takes a rather isolated position within this group. Apart from size and number of muscle scars, *D. incae* is in general easily distinguishable by its morphology from the other living representatives of *Darwinula* recorded from central and South America. The ill-described *D. managuensis* Swain and Gilby, 1965 presents compressed valves and a nearly ovoid left valve; *D. africana brasiliensis* Pinto and Kotzian, 1961 and *D. pagliolii* Pinto and Kotzian, 1961 are characterized by an internal postero-ventral tooth in the left valve and by a small keel at the postero-ventral corner of the right valve, respectively; *D. serricaudata espinosa* Pinta and Kotzian, 1961 has an elongated shell in lateral view; in *D. auraucana* Löffler, 1961 right valve overlaps the left; *D. dicastrii* Löffler, 1966 is quite compressed in lateral view, with anterior and posterior margins slightly rounded. Not so clearly distinguishable from *D. incae* is *D. setosa* Daday, 1902. Possibly, *D. setosa* will in time have to be considered a senior synonym of *D. incae*, but the inadequate original description of the former and the fact that its type material consists of one crushed female only do not allow a decision to date.

Explanation of Plate 23, 38

Fig. 1, female LV, int. lat. (**OC 1794**, 773 μm long); fig. 2, female RV, int. lat. (**OC 1794**, 741 μm long); fig. 3; female LV, int. lat., detail of adductor musc. sc. (**OC 1794**); fig. 4, female RV, int. lat., detail of adductor musc. sc. (**OC 1794**).
Scale A (200 μm; ×120), figs. 1, 2; scale B (100 μm; ×503), figs. 3, 4.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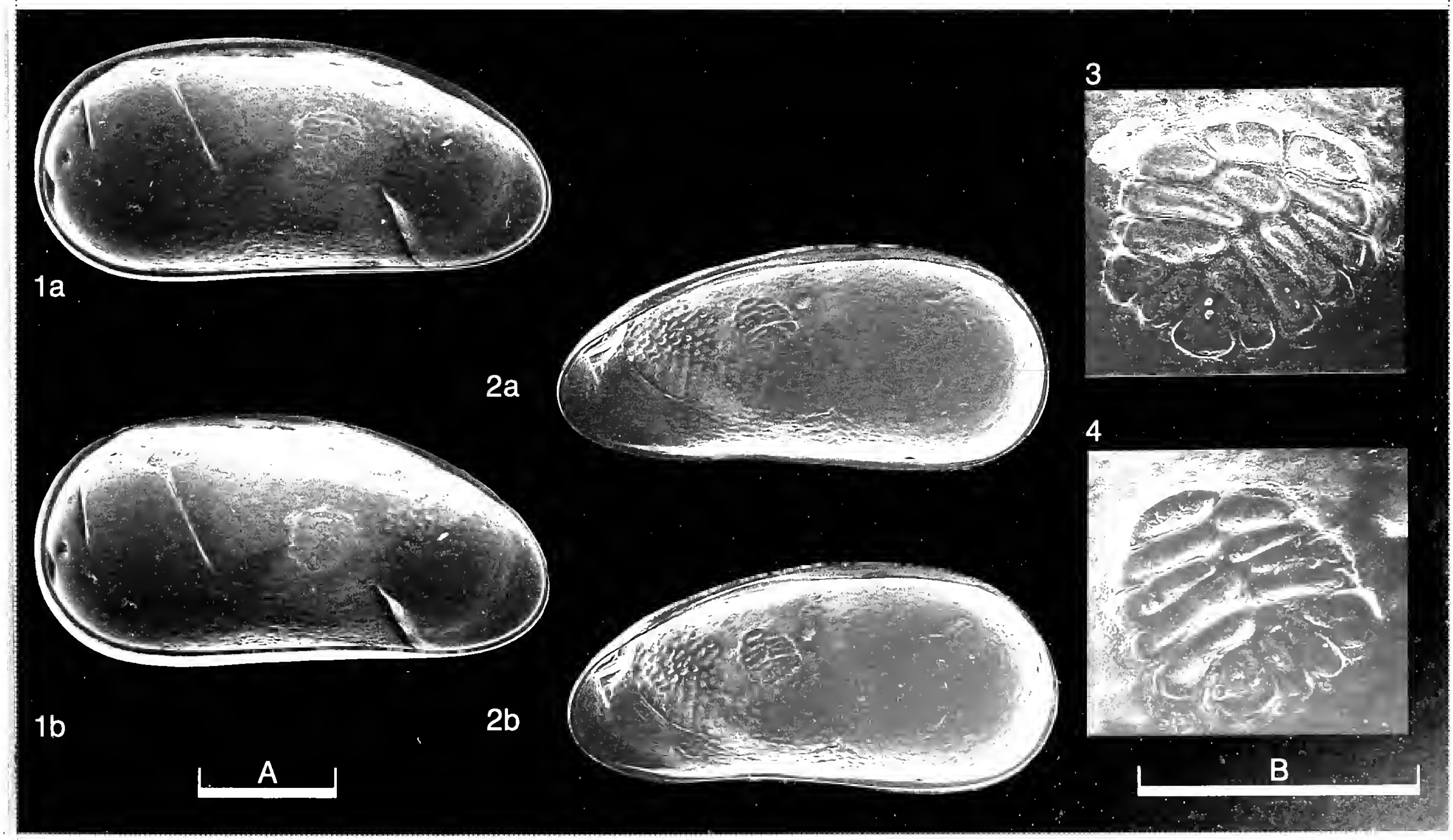
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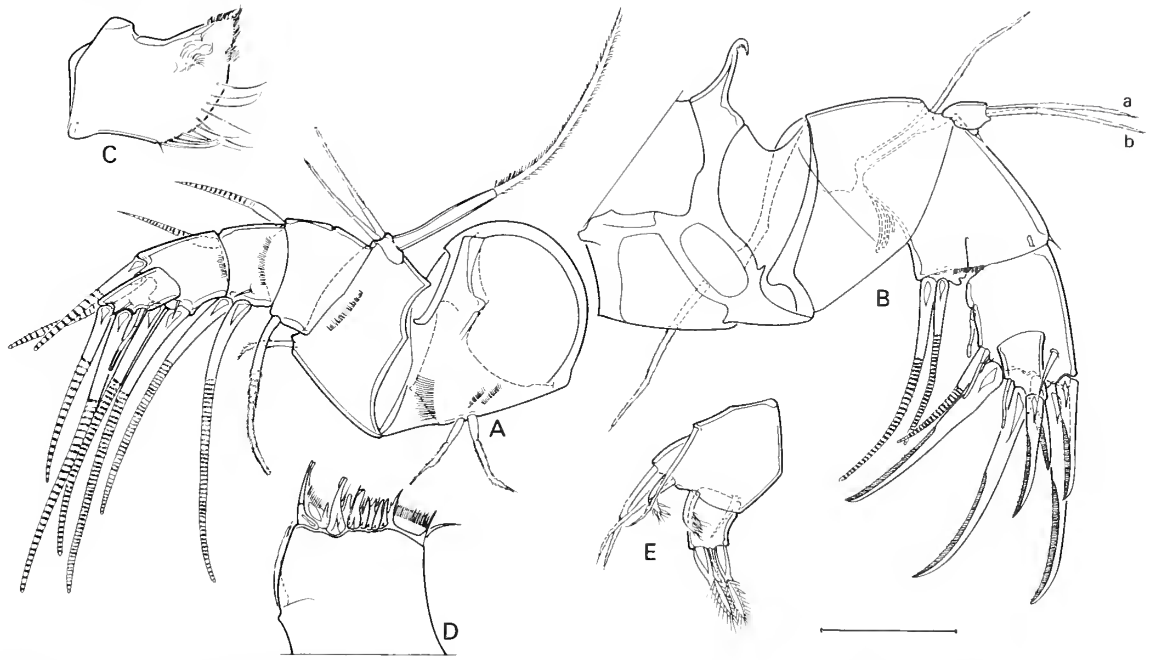
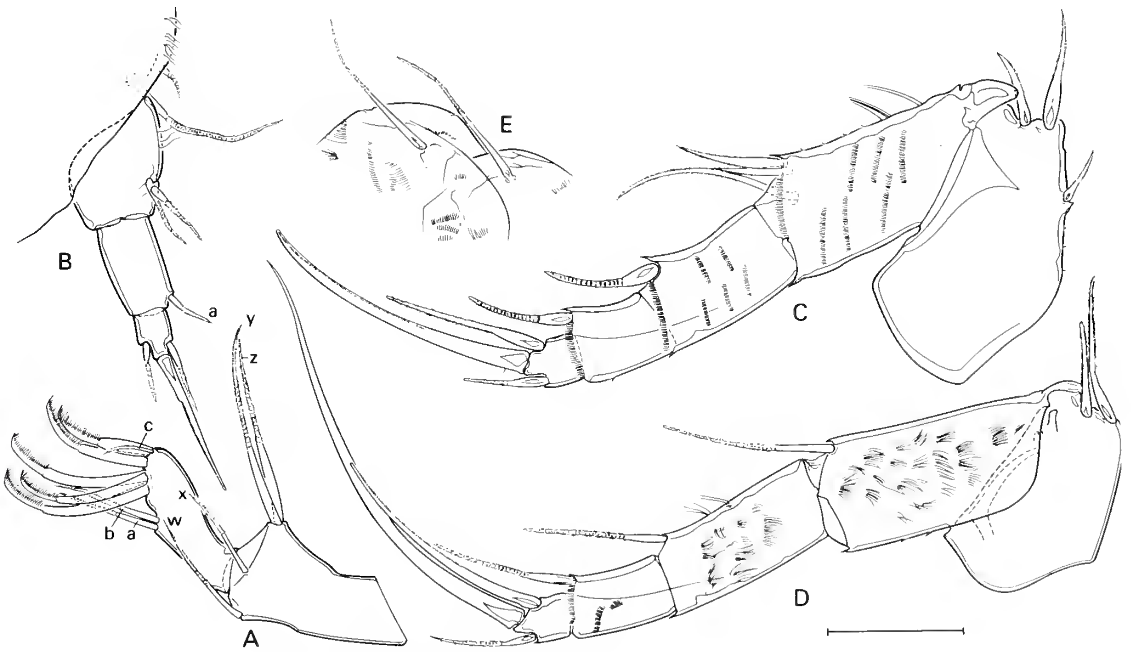
Distribution: Recent, freshwater: Peruvian and Bolivian Altiplano.

Acknowledgements: We gratefully acknowledge support from the E.U. Human Capital and Mobility Program (contract ERBCHRXCT/93/0253). J. Cillis and C. Behen (Brussels, Belgium) offered technical assistance with the SEM images and with the line drawings respectively.



Text-fig. 1. Appendages: A, A1 (**OC 1794**); B, A2 (**OC 1794**); C, upper lip (**OC 1795**); D, Md-masticatory process (**OC 1794**); E, Mxl-palp (**OC 1796**). Scale bar = 54 μm for 1A,B; 106 μm for 1C; 43 μm for 1D,E.



Text-fig. 2. Appendages: A, Md-palp, 2nd and 3rd segment (**OC 1794**); B, M x 2-endopodite (**OC 1796**); C, T1 (**OC 1794**); D, T2 (**OC 1795**); E, furcae (**OC 1795**). Scale bar = 54 μm for 2A–E.

ON *WENLOCKIELLA PHASEOLA* (JONES)

by Lee E. Petersen and Robert F. Lundin
(Anadarko Petroleum Corporation, Houston, U.S.A. and Arizona State University, Tempe, U.S.A.)

Wenlockiella phaseola (Jones, 1887)

1887 *Bythocypris phaseolus* sp. nov. T.R. Jones, *Ann. mag. nat. Hist., (5),* **19**, 189, pl. 7, figs 11a, 12b.
non 1923 *Bythocypris phaseolus* Jones; E.O. Ulrich and R.S. Bassler, *Maryland Geol. Surv.*, **Silurian**, 702, pl. 63, figs. 5, 6.
1934 *Bythocypris phaseolus* Jones; R.S. Bassler and B. Kellett, *Geol. Soc. Am. Sp. Pap.* **1**, 230.
1991 *"Bairdiocypris" phaseolus* (Jones); R.F. Lundin, L.E. Petersen & D.J. Siveter, *J. Micropalaeontol.*, **9** (part 2 for 1990), pl. 2, fig. 11.

Lectotype: We here designate as the lectotype the specimen on Natural History Museum (**NHM**), London, England, slide no. **IN 52405** (*ex.* **I 1919**) which contains one carapace of an immature specimen that agrees well with the specimen illustrated by Jones (1887, *op. cit.*, figures 12a, 12b).

Type locality: Buildwas, Shropshire, England; Vine collection XII, bed no. 38, Buildwas Formation, Wenlock Series, Silurian. G.R. Vine (1887, *Proc. Yorks. geol. polytech. Soc.*, **9**, 224–248) records bed no. 38 as from "above Buildwas Bridge".

Figured specimens: Department of Geology, Arizona State University (**ASU**), nos. **X-147** (car.: Pl. **23**, 44, figs. 5, 6), **X-277** (car.: Pl. **23**, 42, figs. 1–4), **X-278** (car.: Pl. **23**, 44, figs. 1–4) and **X-279** (car.: Pl. **23**, 42, fig. 7. Natural History Museum, London, no. **IN 52405** (lectotype, car.: Pl. **23**, 42, figs. 5, 6).

Explanation of Plate 23, 42

Figs. 1–4, car. (**ASU X-277**, 987 μm long, 508 μm high): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.; fig. 3, ext. dors.; fig. 4, ext. post.
Figs. 5, 6, juv. car. (lectotype, **NHM IN 52405**, 725 μm long): fig. 5, ext. rt. lat.; fig. 6, ext. lt. lat. Fig. 7, juv. car. (**ASU X-279**, 677 μm long): ext. rt. lat.
Scale A (200 μm; ×53), figs. 1–4; scale B (200 μm; ×58), figs. 5, 6; scale C (150 μm; ×72), fig. 7.

ASU X-147 and **X-279** are from the lower part of the Coalbrookdale Formation at Buildwas Bridge (Nat. Grid Ref. SJ 6451 0445), Shropshire, England (locality 34 of Lundin *et al.*, *op. cit.*, 1991). **ASU X-277** and **X-278** are from the Buildwas Formation at Buildwas Abbey (Nat. Grid Ref. SJ 643 045), Shropshire, England (locality 37 of Lundin *et al.*, *op. cit.*, 1991). **NHM IN 52405** is from the Buildwas Formation at the type locality. All specimens are from the Sheinwoodian, Wenlock Series, Silurian, at approximately lat. 52° 39′ N, long. 2° 33′ W.

Diagnosis: Medium-sized *Wenlockiella* with elongate subreniform lateral outline and subellipsoidal longitudinal and transverse outlines. Dorsum very gently arched and left/right overreach along hinge line weak. Perimarginal ridge present along anteroventral margin of right valve of well-preserved adult specimens, absent from juveniles.

Remarks: The species described here is most similar to *W. crassula* (Jones, 1887), from which it can be distinguished by its more elongate lateral outline, its less-arched dorsum and by its weaker left/right overreach along the hinge structure. All of the approximately 80 specimens studied are carapaces. The contact margin features and interior features, interpreted from a single longitudinal thin section, are similar to those of the type-species of the genus (see Lundin and Petersen, *Stereo-Atlas Ostracod Shells*, **20**(12), 53, text-fig. 1b, 1993).

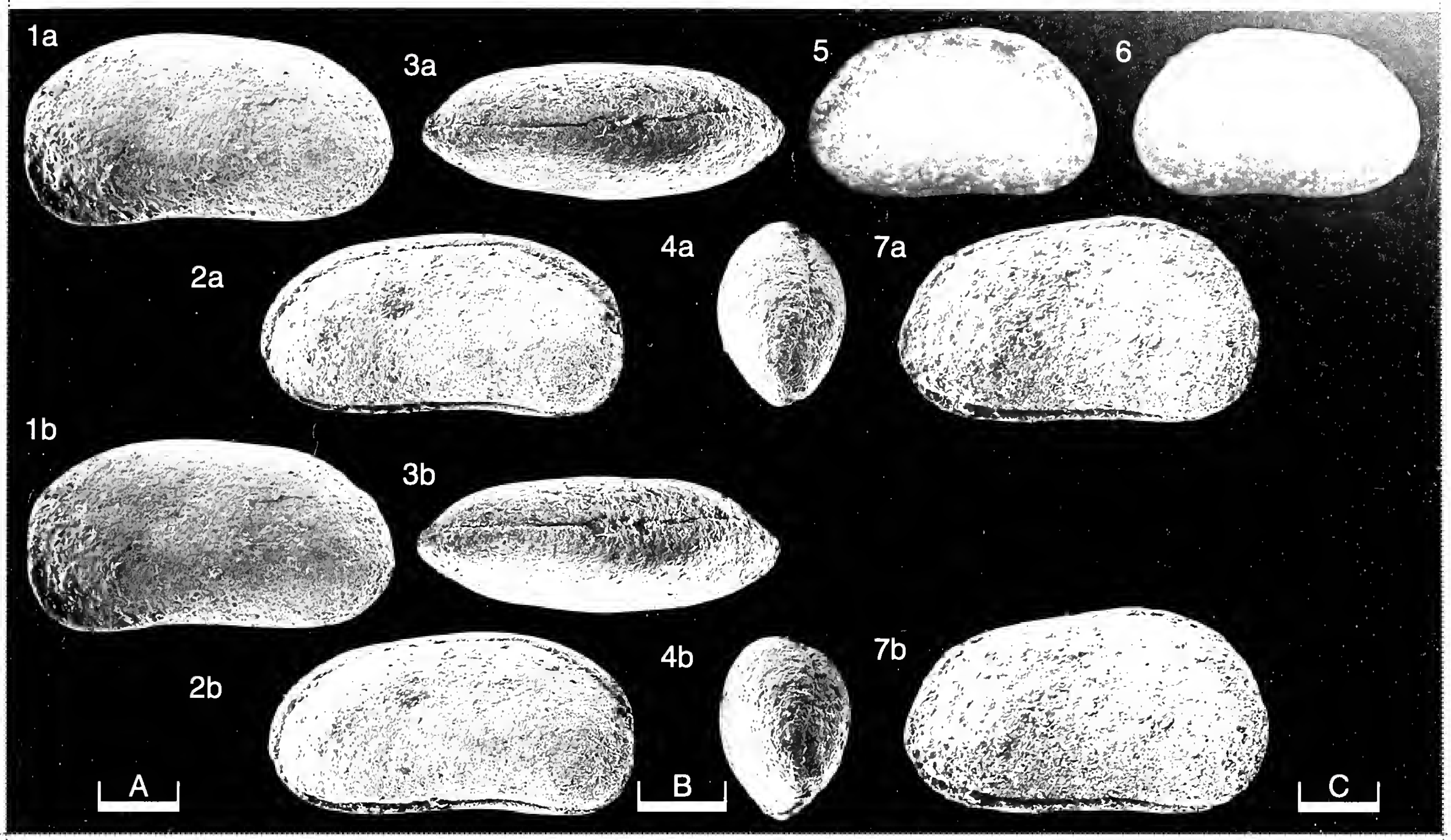
W. phaseola is morphologically more similar to *W. crassula* than to *Wenlockella phillipsiana* (Jones & Holl, 1869) suggesting that it is directly ancestral to *W. crassula*. However, the possibility that *W. phillipsiana* is the direct ancestor of both *W. phaseola* and *W. crassula* cannot be ruled out.

Distribution: *W. phaseola* is known from late Llandovery and Sheinwoodian strata, Silurian of Britain (Lundin *et al.*, *op. cit.*, 1991).

Acknowledgements: We gratefully acknowledge support from the National Science Foundation (Grant No. EAR-8200816).

Explanation of Plate 23, 44

Figs. 1–4, car. (**ASU X-278**, 1053 μm long, 526 μm high): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.; fig. 3, ext. vent.; fig. 4, ext. post.
Figs. 5, 6, car. (**ASU X-147**, 921 μm long); fig. 5, ext. lt. lat.; fig. 6, ext. rt. lat.
Scale A (200 μm; ×49), figs. 1–4; scale B (200 μm; ×57), figs. 5, 6.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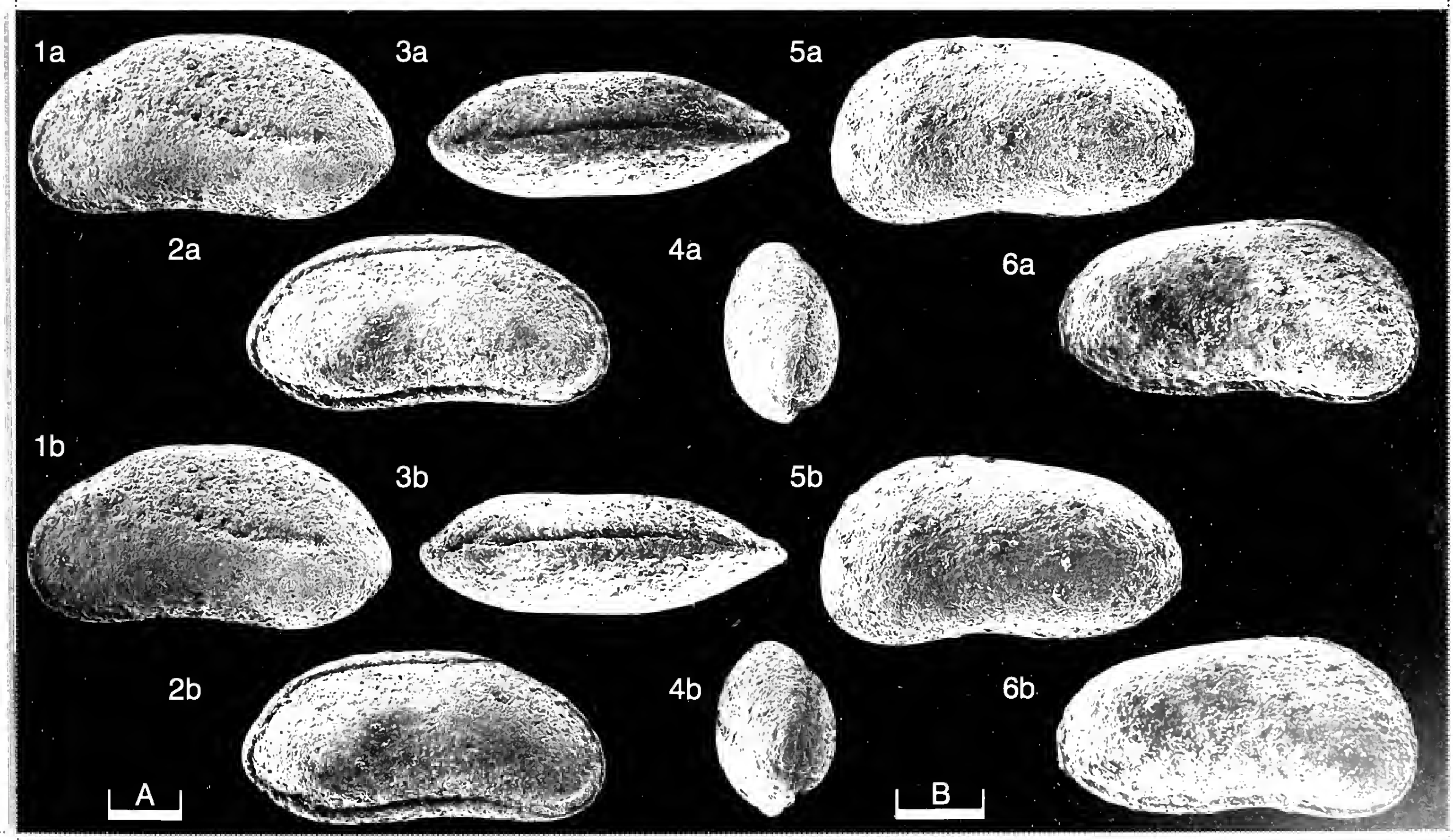
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Stereo-Atlas of Ostracod Shells 23 (11) 45–48 (1996)
595.337.21 (113.331) (420 : 162.003.52) : 551.351

ON *CYTHERELLINA ELEGANS* (JONES)

by Lee E. Petersen and Robert F. Lundin
(Anardarko Petroleum Corporation, Houston, and Arizona State University, Tempe, U.S.A.)

Cytherellina elegans (Jones, 1887)

1887 *Macrocypris elegans* sp. nov. T.R. Jones, *Ann. Mag. nat. Hist.*, (5), **19**, 180, pl. 5, figs. 8a–c.
1887 *Macrocypris siliquoides* sp. nov. T.R. Jones, *Ann. Mag. nat. Hist., (5),* **19**, 181, pl. 5, figs. 9a–c.
1887 *Bythocypris concinna* sp. nov. T.R. Jones, *Ann. Mag. nat. Hist.*, (5), **19**, 186, pl. 5, figs. 6a–c.
1887 *Bythocypris testacella* sp. nov. T.R. Jones, *Ann. Mag. nat. Hist.*, (5), **19**, 186, pl. 5, figs. 5a–c. pl. 3, figs. 1, 2.
1991 *"Cytherellina" elegans* (Jones); R.F. Lundin, L.E. Petersen and D.J. Siveter, *J. Micropalaeontol.* **9** (part 2 for 1990), 179, pl. 1, fig. 8.

Holotype: The Natural History Museum (**NHM**), London, England, no. **I 1911**; adult carapace. This was the only specimen available to Jones (1887, *op. cit.*), and it agrees well with his illustration.

Type locality: Vine Collection no. III, Bed no. 40, "Buildwas Beds", as reported by Jones (1887, *op. cit.*). This Silurian collection is reported by Vine (*Proc. Yorks, geol. polytech. Soc.*, **9**, 224–248, 1887) to be from the "banks of the River Severn, above Buildwas Bridge," making it approximately equivalent to loc. 34 of Lundin *et al.*, (1991, *op. cit.*); approximately lat. 52° 38′ 15″ N, long. 2° 31′ 30″ W (National Grid Ref. SJ 6451 0445). See comments below under *Distribution*.

Figured specimens: Department of Geology, Arizona State University, (**ASU**), nos. **X-130** (adult car.: Pl. **23**, 48, figs. 3–5), **X-312** (adult car.: Pl. **23**, 48, figs. 1, 2) and **X-313** (adult car.: Pl. **23**, 46, figs. 1–4). Specimen **NHM I 1911** (holotype, adult car.: Pl. **23**, 46, figs. 5, 6).

Explanation of Plate 23, 46

Figs. 1–4, car. (**ASU X-313**, 1165 μm long): fig. 1, ext. rt. lat.; fig. 2, ext. lt. lat.; fig. 3, ext. vent.; fig. 4, ext. post. Figs. 5, 6, car. (holotype, **NHM I 1911**, 1180 μm long): fig. 5, ext. rt. lat; fig. 6, ext. vent.
Scale A (200 μm; ×45), figs. 1–4; scale B (200 μm; ×43), figs. 5, 6.

NHM I 1911 is from the type locality. **ASU X-130**, **X-312** and **X-313** are from the Much Wenlock Limestone Formation at Lincoln Hill (loc. 49 of Lundin, Petersen and Siveter, 1991, *op. cit.*), Shropshire; approximately lat. 52° 38′ N, long. 2° 29′ W (National Grid Ref. SJ 6693 0381); Homerian Stage, Wenlock Series, Silurian.

Diagnosis: Relatively elongate, narrow *Cytherellina* with a poorly developed posterior straguloid process, and ventriculus with distinct anterior boundary but indistinct posterior boundary. Left/right overreach weak but best developed antero- and posterodorsally and midventrally. Surface smooth. Details of hinge and contact margin unknown.

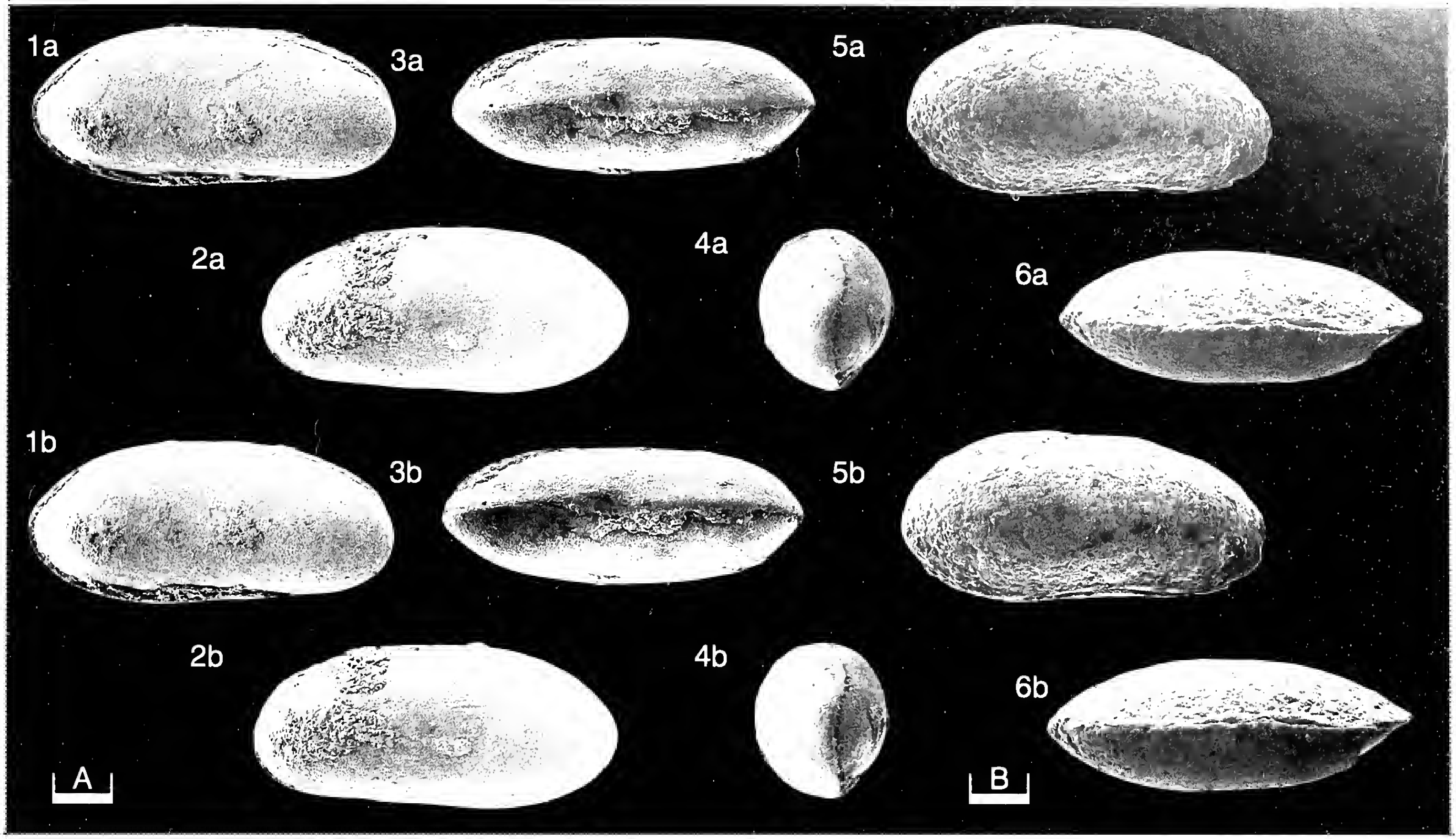
Remarks: We have studied the type specimens of *Macrocypris siliquoides, Bythocypris concinna* and *Bythocypris testacella*, all of which were erected by Jones (1887, *op. cit.*; see synonymy above). We conclude that these specimens are conspecific with *C. elegans*. The latter is readily distinguished from *Cytherellina jonesi* Petersen and Lundin (*Stereo-Atlas of Ostracod Shells*, **23**, 49–52, 1996) by its smaller height/length and width/length ratios.

Distribution: Known from seven samples of late Wenlock, Homerian, age and from one sample (locality no. 59 of Lundin, Petersen and Siveter 1991, *op. cit.*) of Ludlow, early Gorstian, age in the Welsh Borderland. Jones (1887, *op. cit.*) reported the holotype and one of his two specimens of *Macrocypris siliquoides*, here placed in synonymy with *C. elegans*, to be from the "Buildwas Beds" and thus of Sheinwoodian, early Wenlock age. We have examined some thirty-six samples and identified more than 3000 non-palaeocope ostracode specimens from the Sheinwoodian of the Wenlock type area and have never found a specimen of *C. elegans* from that stratigraphic horizon. We conclude that the anomalous occurrences reported by Jones (1887, *op. cit.*) are the result of contamination from Homerian strata or collections.

Acknowledgements: We gratefully acknowledge the support of the College of Liberal Arts and Sciences, Arizona State University and the help of David J. Siveter in determining geographic and stratigraphic positions of some of the collections described by T.R. Jones.

Explanation of Plate 23, 48

Figs. 1, 2, car. (**ASU X-312**, 1109 μm long): fig. 1, ext. vent.; fig. 2, ext. rt. lat. Figs. 3–5, car. (**ASU X-130**, 1165 μm long): fig. 3, ext. rt. lat.; fig. 4, ext. dors.; fig. 5, ext. lt. lat.
Scale A (200 μm; ×46), figs. 1, 2; scale B (200 μm; ×49), figs. 3–5.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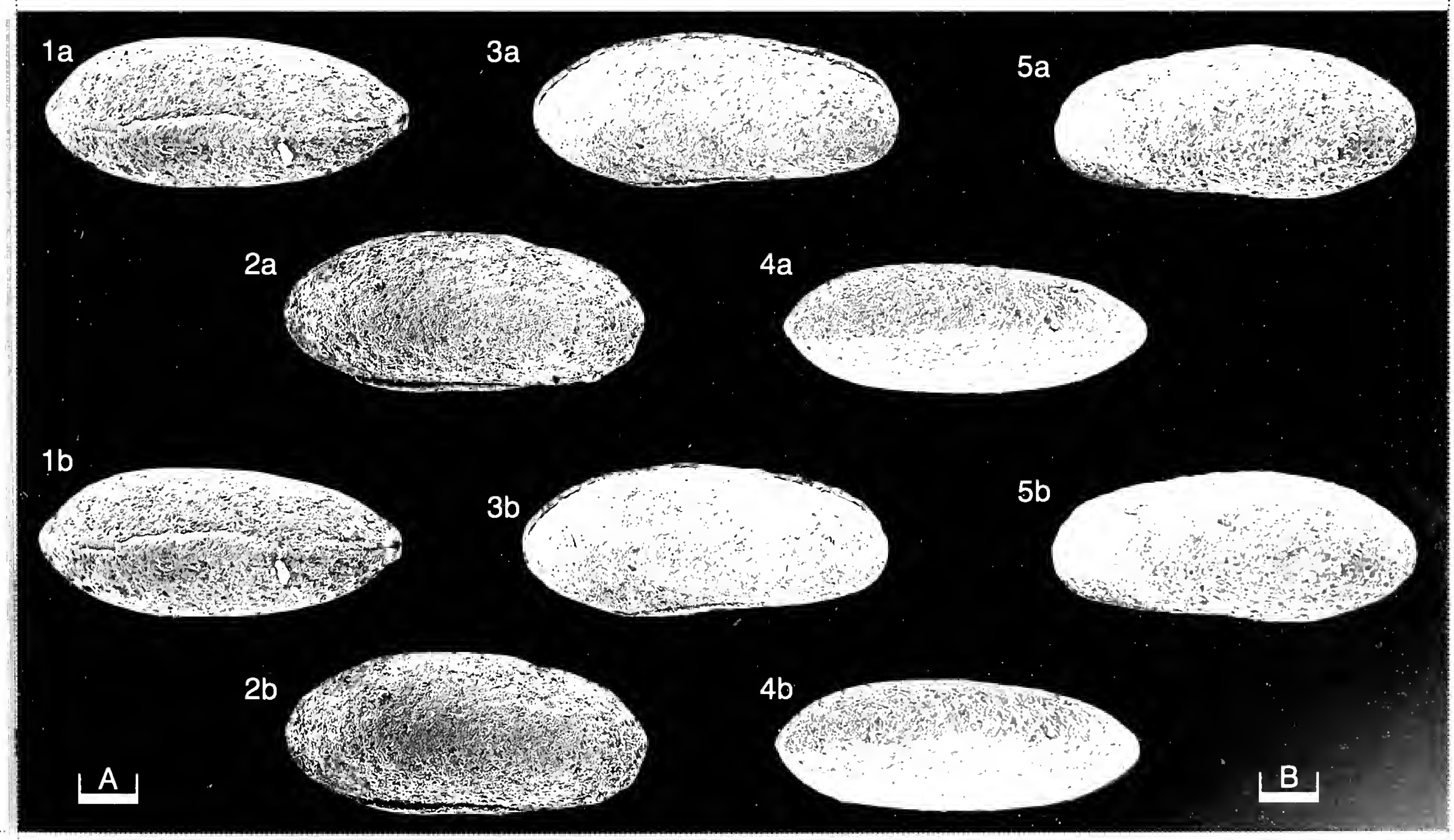
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Stereo-Atlas of Ostracod Shells 23 (12) 49–52 (1996)
595.337.21 (113.333 + 113.331) (420 : 162.003.52) : 551.351

ON *CYTHERELLINA RUPERTI* sp. nov.

by Lee E. Petersen and Robert F. Lundin
(Anadarko Petroleum Corporation, Houston, U.S.A. and Arizona State University, Tempe, U.S.A.)

Cytherellina ruperti sp. nov.

1869 *Cytherellina siliqua* (Jones); T.R. Jones and H.B. Holl, *Ann. Mag. nat. Hist.*, (4), 3, 216, pl. 14, fig. 2, ? fig. 5.
1991 *"Cytherellina"* sp. nov. R.F. Lundin, L.E. Petersen and D.J. Siveter, *J. Micropalaeontol.*, 9 (pt. 2 for 1990), pl. 1, fig. 9.

Holotype: The National History Museum (**NHM**), London, England, **OS 14898** (ex., no. **I 2069**); adult carapace. [Paratypes: Department of Geology, Arizona State University (**ASU**), nos. **X-131, X-280** and **X-282**].

Type locality: Chance's Pitch, a road section about 2 km W of Little Malvern, Hereford and Worcestershire, England; approximately lat. 52° 03′ N, long. 2° 18′ W. National Grid Ref.: SO747402; Aymestry Limestone, Gorstian Stage, Ludlow Series, Silurian.

Derivation of name: In honour of Professor Thomas Rupert Jones, doyen of British micropalaeontology in the 19th century.

Figured specimens: Department of Geology, Arizona State University (**ASU**), nos. **X-131** (paratype, adult car.: Pl. **23**, 50, figs. 1–4), **X-282** (paratype, adult car.: Pl. **23**, 50, fig. 5), **X-280** (paratype, adult car.: Pl. **23**, 52, figs. 1–3), and **NHM OS 14898** (holotype, adult car.: Pl. **23**, 52, figs. 4, 5).

NMH OS 14898 is from the type locality. **ASU X-131** and **X-280** are from the Much Wenlock Limestone Formation at Croft Farm 0.5 km W of West Malvern, Hereford and Worcestershire; approximately lat. 52° 08′ N, long. 2° 18′ W (National Grid Ref. SO75674650); **X-282** is from the Much Wenlock Limestone Formation at Wren's Nest, Dudley, West Midlands; approximately lat. 52° 27′ N, long. 2° 3′ W (National Grid Ref. SO93579199); Homerian Stage, Wenlock Series, Silurian.

Explanation of Plate 23, 50

Figs. 1–4, car. (paratype, **ASU X-131**, 1109 μm long): fig. 1, ext. post.; fig. 2, ext. vent.; fig. 3, ext. dors.; fig. 4, ext. rt. lat. Fig. 5, LV (paratype, **ASU X-282**, 1128 μm long). int. lat.
Scale A (200 μm, ×47), figs. 1–5.

Diagnosis: *Cytherellina* species with poorly developed adductorial recess, moderately developed ventriculus with distinct anterior boundary but indistinct posterior boundary. Posterior straguloid process weak; commissure anterior to hinge straight. Short stop ridge present along ventral contact margin just behind midlength. Surface very finely striate.

Remarks: In establishing the genus *Cytherellina* Jones and Holl (1869, *op. cit.*) emphasized the "undulated contours" which are present on steinkerns of the type-species, *C. siliqua* (Jones, 1855). These "undulations" are the reflection of a large, well-developed adductorial recess on the interior surface of the valves of this species. The development of the adductorial recess is, however, variable between species as shown by *C. ruperti* and another congeneric species from the Hemse Beds (Ludlow Series) of Gotland. The Gotland species has a small distinct adductorial recess but it is less well-developed than that of the type-species, whereas the adductorial recess of *C. ruperti* is very poorly developed. The species described here also differs from the type-species in its much smaller size, and from the Gotland species in its distinctly less-arched dorsal margin. Two species erected by A. Pranskevichius (*Lithuanian Sci-Res. Geol. Surv. Inst., SSR, Trans.* **15**, 110, 111, 1972), namely *Healdianella piriformis* and *Healdianella virbalica*, are similar to *C. ruperti* and certainly belong to *Cytherellina*. The first of these species differs from *C. ruperti* in having a distinctly sinuate ventral margin and more sharply rounded anterior margin. *C. virbalica* has a more bluntly rounded anterior margin and less left/right ventral overreach than *C. ruperti*.

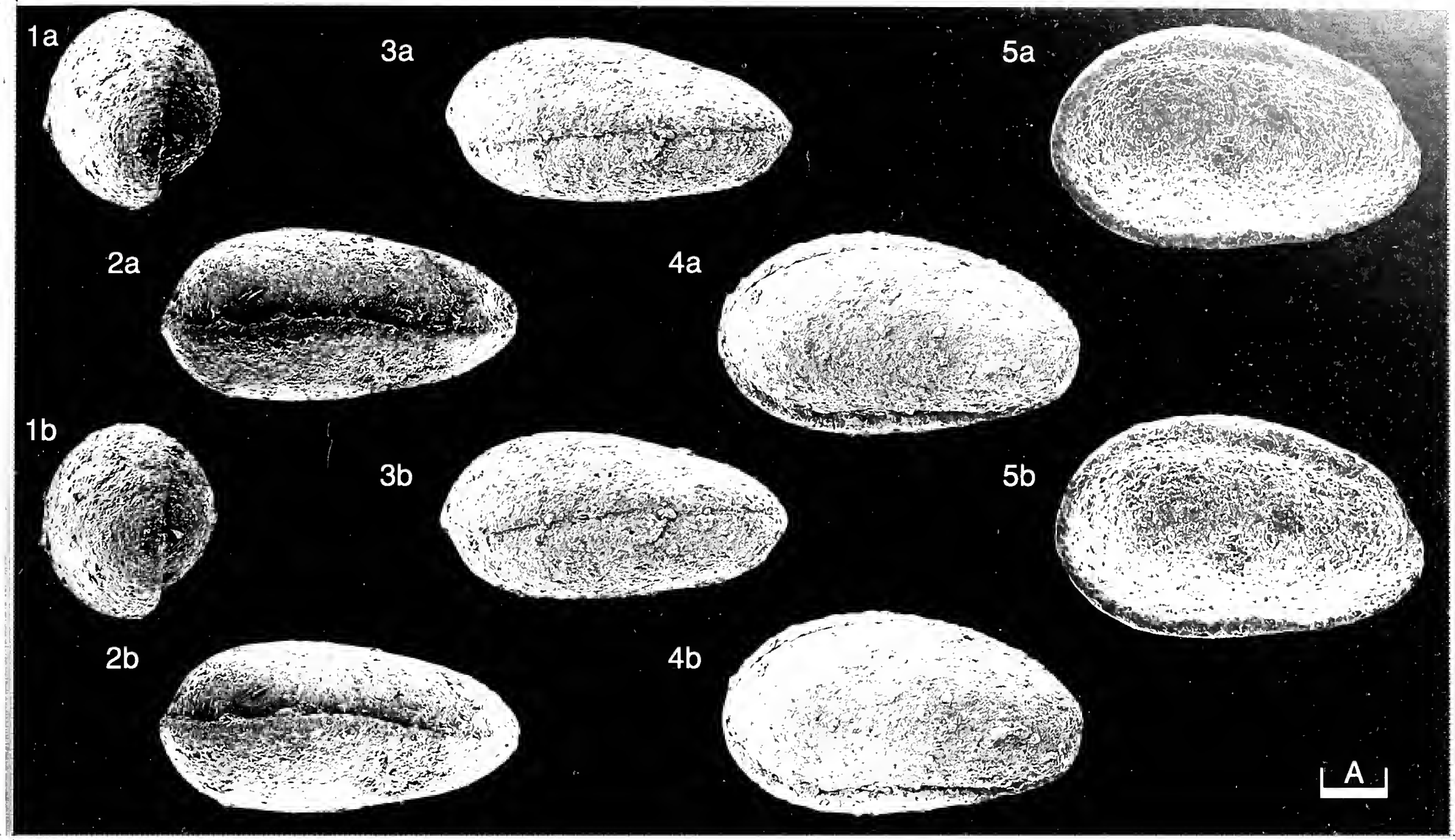
Jones and Holl (1869, *op. cit.*, pl. 14, fig. 5) illustrated another specimen, from basal upper Ludlow beds near the type locality, which they concluded to be conspecific with the holotype. We have not seen this specimen but, on the basis of Jones and Holl's illustration, we agree with question.

Specimens of *C. ruperti* are normally abraided. However, the excellent preserved holotype clearly shows that the species is very finely striate.

Distribution: This species is known from strata of late Wenlock (Homerian), as reported by Lundin, Petersen and Siveter (1991, *op. cit.*), through early (and possibly early late) Ludlow, Silurian age of the English West Midlands and Welsh Borderland.

Explanation of Plate 23, 52

Figs. 1–3, car. (paratype, **ASU X-280**, 1222 μm long): fig. 1, ext. rt. lat.; fig. 2, ext. lt. lat.; fig. 3, ext. vent. Figs. 4, 5, car. (holotype, **NMH OS 14898**, 1250 μm long): fig. 4, ext. rt. lat.; fig. 5, ext. vent.
Scale A (200 μm; ×43), figs. 1–3; scale B (200 μm; ×41), figs. 4, 5.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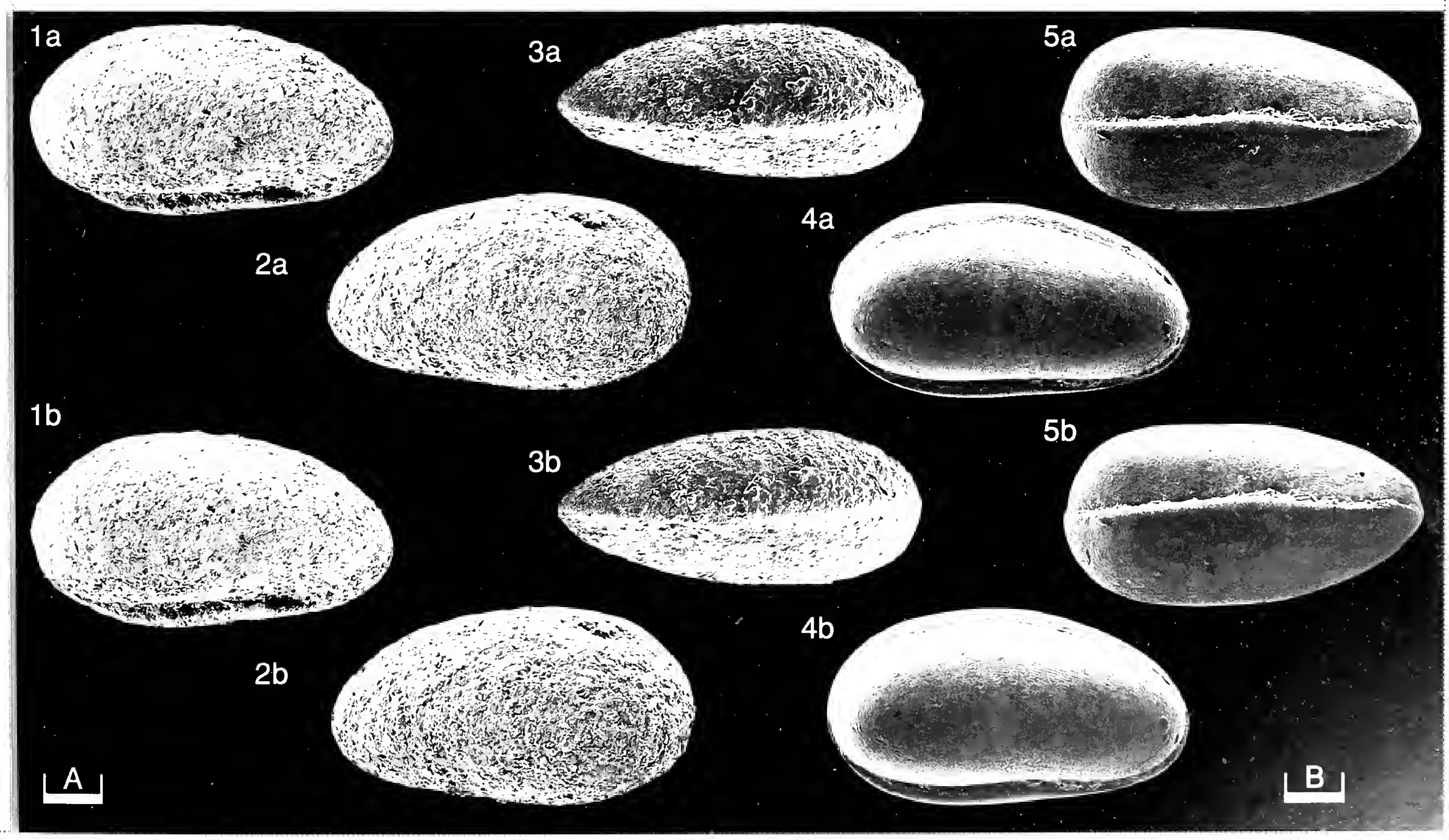
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Stereo-Atlas of Ostracod Shells 23 (13) 53–60 (1996)
595.337.21 (116.212) (430:162.009.52):551.35 + 552.52

ON *OGMOCONCHA CONTRACTULA* TRIEBEL

by Ian Boomer and Thomas Jellinek
(University of East Anglia, Norwich, England and Senckenberg Museum, Frankfurt, Germany)

Genus *OGMOCONCHA* Triebel, 1941

Type-species (by orginal designation): *Ogmoconcha contractula* Triebel, 1941

Diagnosis: (Original) A genus of the Healdiidae Harlton, 1933 with the following characteristics. Carapace inflated, egg-shaped, usually with marginal denticles. Lacking a steeply sloping postero-dorsal margin and without a vertical flexture in the posterior part of the carapace. (Additional) Carapace heavily calcified, overlap entire and well marked, central margin broadly convex particularly in the larger left valve. Contact groove in the left valve is entire. Hinge elements broad and inflated terminally, bearing many fine transverse crenulae. Adductor muscle pattern consists of a double row of 3–7 central scars surrounded by a single outer ring of 12–13 smaller scars, a single rounded frontal muscle scar is present (note that the development of the muscle scar pattern will be strongly influenced by preservation). Greatest width at or just behind midlength. External lateral surfaces generally unornamented although a few shallow pits may occur, small marginal spines common anteriorly and posteroventrally.

Remarks: Much discussion has centred around the validity of this genus and its possible synonymy with Triassic *Hungarella* (Méhes, 1911) and Liassic *Ogmoconchella* Gründel, 1971 (Lord, A.R., *Bull. geol. Soc. Denmark*, **21**, 319–336, 1972; Malz, H., *Senckenberg. leth.*, **52**, 433–455, 1971). The possible synonymy with *Hungarella* is unlikely given the large number of scars in the central muscle field of the type specimen which was figured by Lord (1972, *ibid.*). The possible synonymy between *Ogmoconcha* and

Explanation of Plate 23, 54

Fig. RV, ext. lat. (paratype, **Xe1268**, 780 μm long). Figs. 2, 3, car, (holotype, **Xe1249**, 830 μm long): fig. 2, dors.; fig. 3, rt. lat. Scale A (100 μm; ×70), figs. 1–3.

Ogmoconchella is considered unproven by the present authors. Although their central muscle scar patterns are similar, there are a number of features which consistently distinguish these two genera. The position of greatest height is in front of midlength in *Ogmoconcha* while it is at or behind midlength in *Ogmoconchella*. The greatest width is at or just behind midlength in *Ogmoconcha* while it is towards the posterior in *Ogmoconchella*. In the former genus the anterior margin is more broadly rounded than the posterior while in the latter genus the reverse is true. Hingement is always stronger in *Ogmoconcha* with terminal widening and well developed crenulations. Externally *Ogmoconcha* is almost always smooth with only marginal spines and occasionally a few shallow puncta (as seen in *O. hagenowi* Drexler, 1958). *Ogmoconchella*, however, may possess a fine "fingerprint" ornament (although this is only observed in well preserved specimens), posteroventral spines and anteromarginal flanges may also be developed.

Ogmoconcha may be synonymous with some of the Triassic genera described by Kristan-Tollmann from the European Alps. A comprehensive examination of the genotype material from Kristan-Tollmann's collections must be undertaken to establish their validity. In summary, the genus is here considered to be a valid taxon distinct from both *Hungarella* and *Ogmoconchella*.

Ogmoconcha contractula Triebel

1941 *Ogmoconcha contractula* gen. et sp. nov. E. Triebel, *Senckenbergiana*, **23**, 378, pl. 14, figs, 156–160.

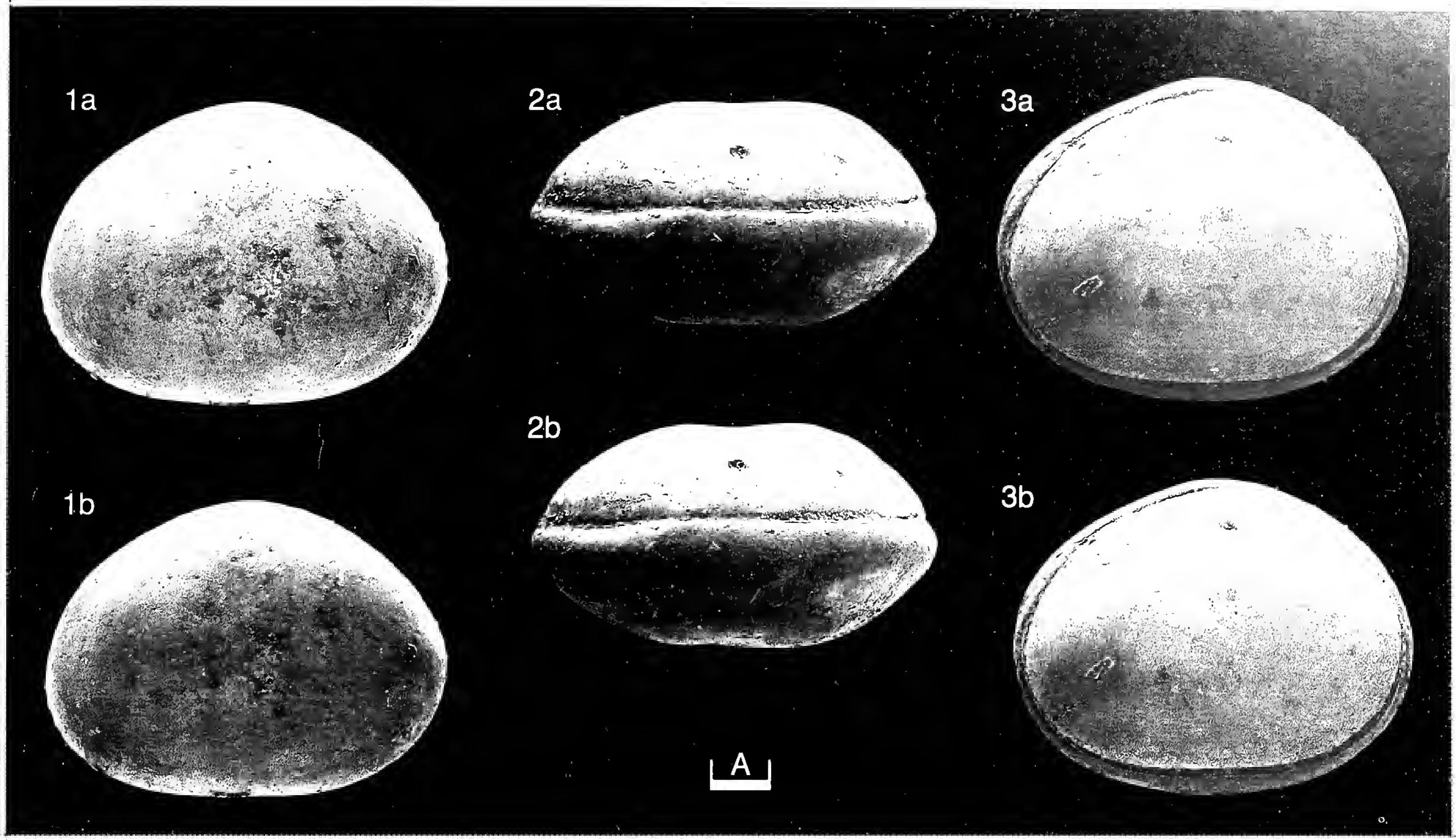
Holotype: Senckenberg Museum, Frankfurt, Germany, no. **Xe1249**, adult carapace. [Paratypes: nos. **Xe1248, Xe1250, Xe1251, Xe1267–Xe1276**].

Type locality: Lias δ, Upper Pliensbachian, Hambühren Borehole WA2 (depth 495-503 m), Hannover, Germany.

Figured specimens: Senckenberg Museum, Frankfurt, Germany, nos. **Xe1268** (paratype, RV: Pl. **23**, 54, fig. 1; pl. **23**, 58, figs. 1, 3; Pl. **23**, 60 figs. 1, 2), **Xe1249** (holotype, car.: Pl. **23**, 54, figs. 2, 3; Pl. **23**, 56, fig. 2). **Xe1248** (paratype, LV: Pl. **23**, 56, figs. 1, 4; Pl. **23**, 58, figs. 2, 4; Pl. **23**, 60, fig. 3), **Xe1274** (paratype, car.: Pl. **23**, 56, fig. 3). All specimens from type locality and horizon.

Explanation of Plate 23, 56

Figs. 1, 4, LV (paratype, **Xe1248**, 775 μm long): fig. 1, detail of musc. sc.: fig. 4, ext. lat. Fig. 2, car. lt. lat. (holotype **Xe1249**, 830 μm long). Fig. 3, car. dors. (paratype, **Xe1274**, 830 μm long).
Scale A (20 μm; ×460), fig. 1; scale B (100 μm; ×70), figs. 2–4.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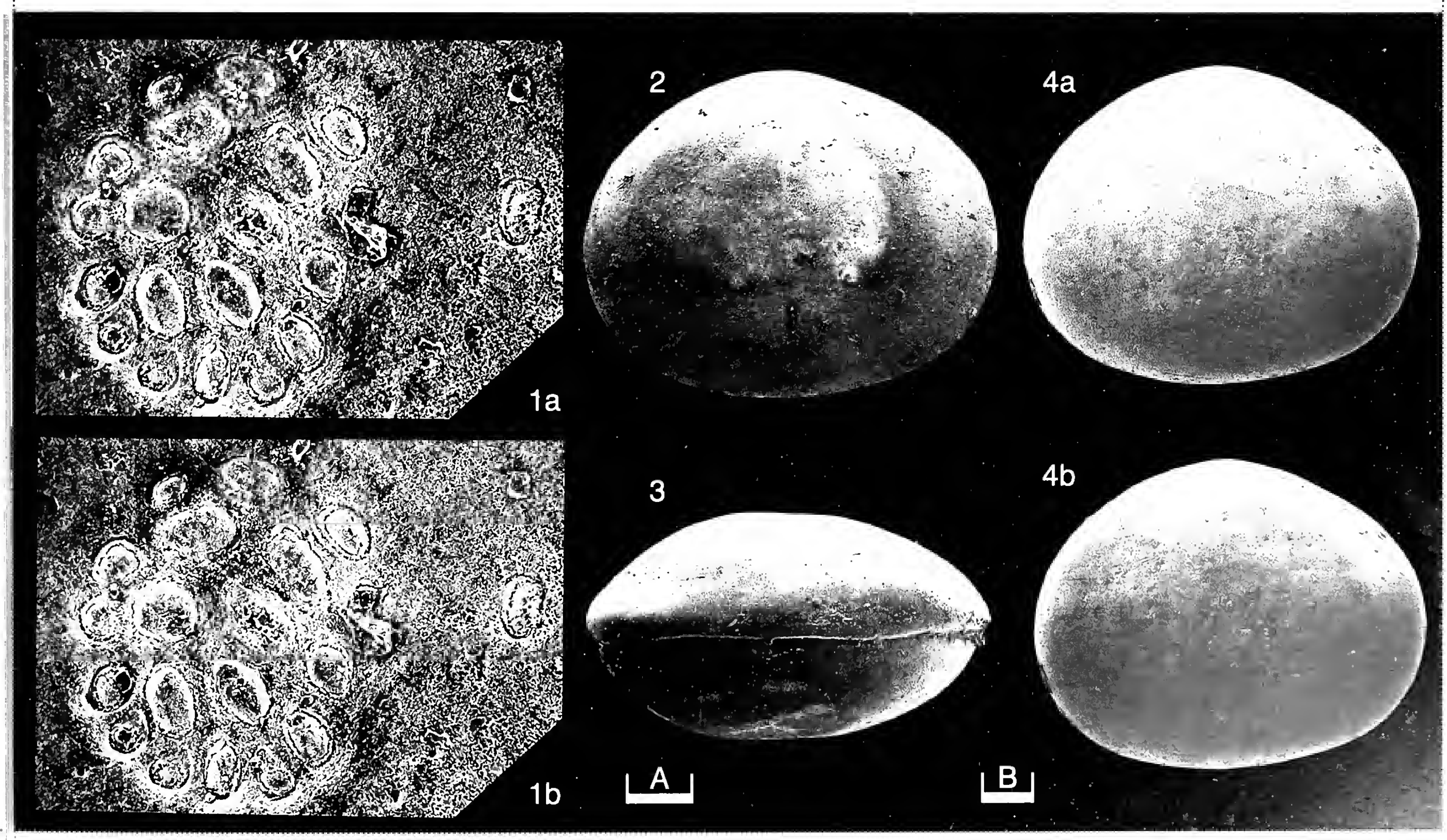
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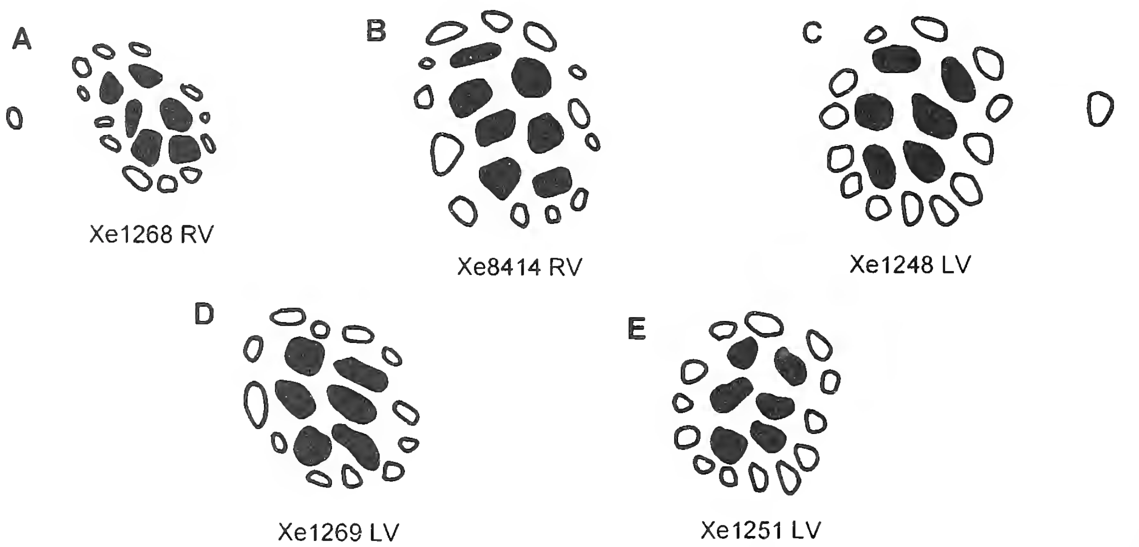
Diagnosis: A species of *Ogmoconcha* with the following characteristics. Valves bear weak anteromarginal denticles, lateral surfaces compressed about the muscle scars so that in dorsal view the lateral extremities of the carapace appear concave (Pl. **23**. 54, fig. 2). Adductor muscle scar and hinge details as for genus.

Remarks: Park (*Stereo-Atlas Ostracod Shells*, **11**, 67–70, 1984) described *Ogmoconcha eocontractula* from the Pliensbachian of the southern North Sea Basin. *O. eocontractula* predates the present species and is distinguished by its larger size and the different lateral outline of each valve. It is almost certainly ancetral to *O. contractula* as it is the only other known liassic species with a laterally compressed carapace. Boomer (*J. Micropalaeont.*, **9**, 205–218, 1991) described *O. convexa* from the lower Toarcian of the Mochras Borehole, Wales. That species is somewhat smaller than *O. contractula* but similar in lateral outline, it differs, however, in that the lateral faces of the carapaces are rounded and not flattened. Boomer (*J. Micropalaeont.*, **10**, 47–57, 1992) recorded a number of metacopine taxa from the Lower Toarcian of SW England which are smaller than *O. convexa*, and possess weakly compressed lateral surfaces.

Distribution: Known from the Pliensbachian and Lower Toarcian of Northwest Europe.

Explanation of Plate 23, 58

Figs. 1, 3, RV (paratype, **Xe1268**, 780 μm long): fig. 1, ant. hinge detail (arrow points anterior); fig. 3, detail of hinge crenulation. Figs. 2, 4, LV (paratype, **Xe1248**, 775 μm long): (arrow points anterior) fig. 2, ant. hinge detail; fig. 4, post. hinge detail. Scale A (100 μm; ×130), fig. 1; scale B (100 μm; ×145), figs. 2, 4; scale C (25 μm; ×450), fig. 3.

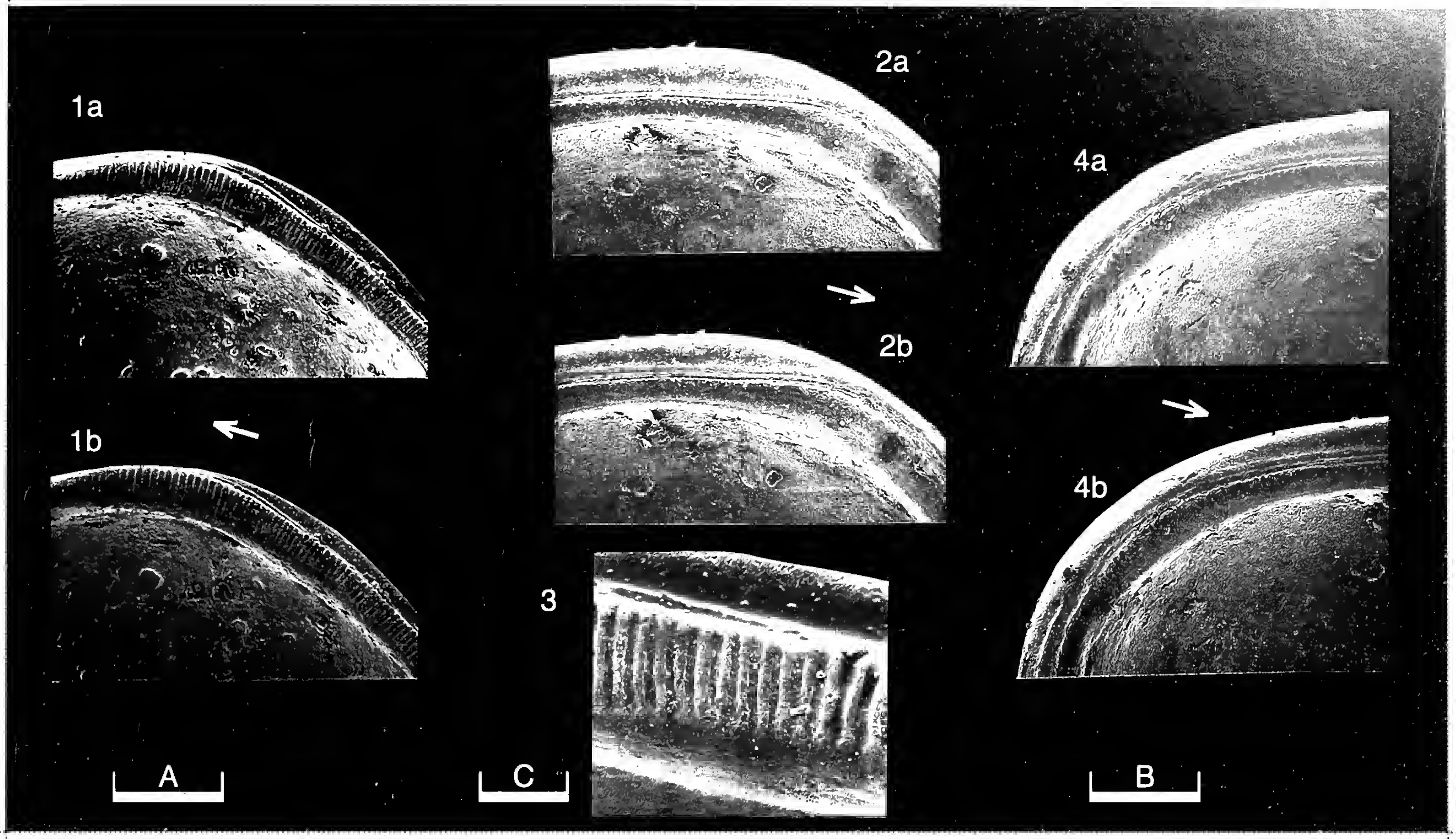


Text-fig. 1. Details of adductor muscle scar patterns taken from published images. A. **Xe1268** RV, ×200. B. **Xe8414** RV, ×300. C. **Xe1248** LV, ×300. D. **Xe1269** LV, ×250. E. **Xe1251**, LV, ×250 (all magnifications approximate).

Explanation of Plate 23, 60

Figs. 1, 2, RV (paratype, **Xe1268**, 780 μm long): fig. 1, post. hinge detail (arrow points anterior); fig. 2, int. lat. Fig. 3, LV int. lat. (paratype, **Xe1248**, 775 μm long).

Scale A (50 μm; ×205), fig. 1; scale B (100 μm; ×71), figs. 2, 3..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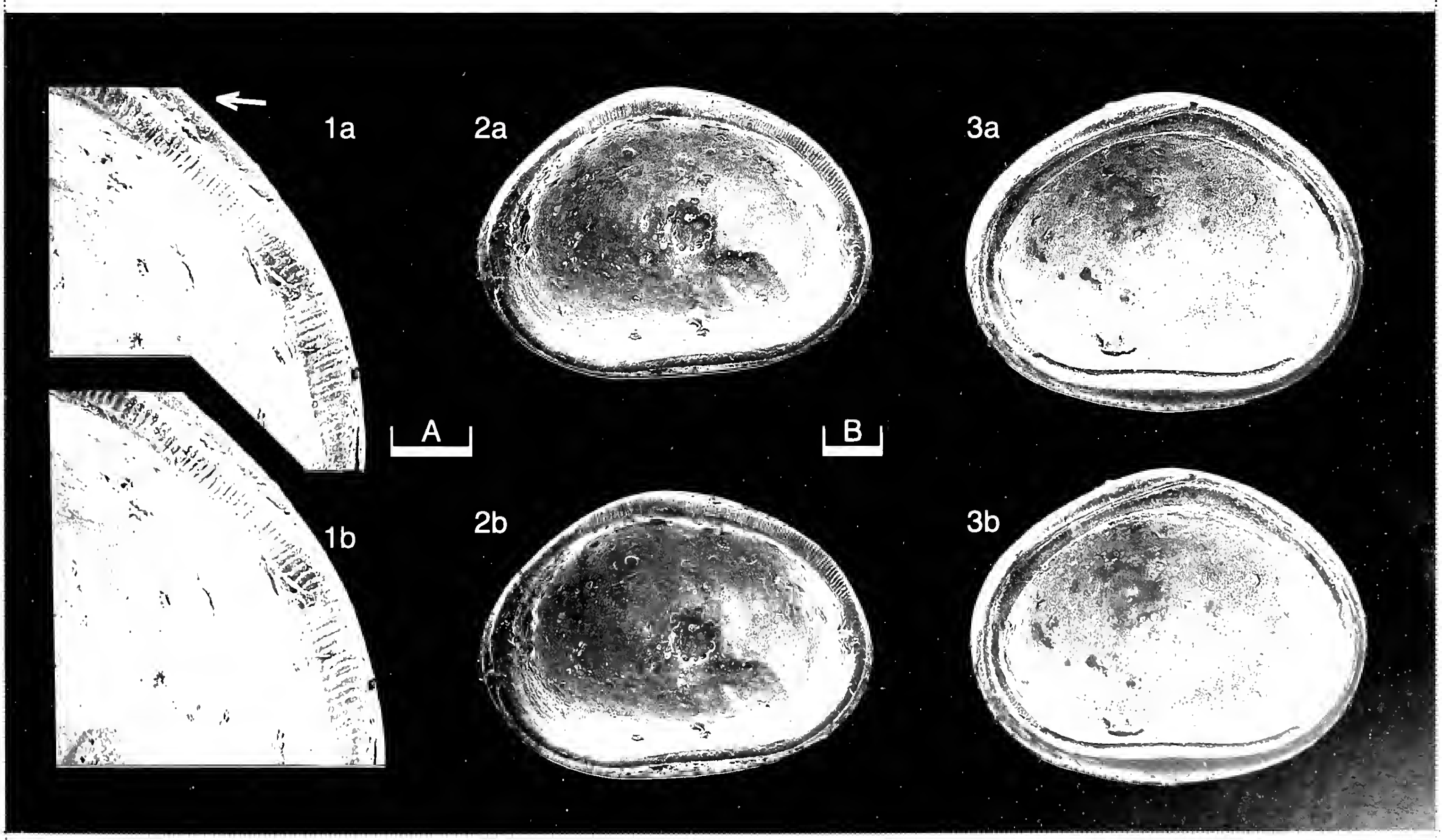
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595.337.12 (119.9) (420: 162.001.52): 551.312

ON *EUCYPRIS VIRENS* (JURINE)

by Robin Smith and Koen Martens
*(Department of Geology, University of Leicester, U.K. and
Royal Belgian Institute of Natural Sciences, Vautierstraat 29, 1000 Brussels, Belgium)*

Genus *Eucypris* Vavra, 1891

1891 *Eucypris* gen. nov. W. Vavra, *Arch. Naturwissensch. Landesdurchforsch. Boehmen,* **8**(3), 82.

Diagnosis: Medium-sized (1-2.5 mm long) genus of the Eucypridinae Bronstein, 1947. Carapace shape elliptical, rounded in lateral view; valves with external (not marginal) tubercles carrying hairs ("porenwarzen") anteriorly; not flattened ventrally, ventral margin sinuously curved in anterior third. Calcified inner lamella broad in both valves, anterior vestibulum approximately 12 times as wide as the fused zone; selvages (if present) marginal, frontal inner lists possible, but always submarginal. M × 1 with second palp segment cylindrical and curved (length approx. twice the basal width). Gamma-seta on Md-palp approx. ten times as long as basal width. Seta d1 on T1 approx. three times as long as d2.

Remarks: Martens (*Arch. Hydrobiol., Suppl.,* **83**, 227-251, 1989) characterized the tribe Eucypridini in the subfamily Eucypridinae Bronstein, 1947, and retained four genera: *Eucypris* Vavra, 1891, *Prionocypris* Brady and Norman, 1896, *Tonnacypris* Diebel and Pietrzeniuk, 1975 and *Tranjancypris* Martens, 1989. Martens *et al.* (*Zool. Middle East*, **7**, 95–114, 1992) added the genus *Eucyprinotus* Sywula, 1972 to the tribe. All of these genera are united by the presence of a "c"-seta on the M × 2; they can be separated from each other by the outline of the valve margin and the length ratio of setae d1 and d2 on T1. The genus *Eucypris* is chacterised by its wide calcified inner lamella, the submarginal inner lists and the absence of selvages, the cylindrical second palp on the M × 1 and the length of seta d1 compared to d2.

Explanation of Plate 23, 62

Fig. 1. ♀ LV, ext. lat. (**OC 2002**, 1520 μm long); fig. 2, ♀ RV, ext. lat. (**OC 2002**, 1480 μm long); fig. 3, ♀ car. ventr. (**OC 2004**, 1530 μm long); fig. 4, ♀ car. dors. (**OC 2004**, 1530 μm long).
Scale a (500 μm; ×40), figs. 1–4.

Eucypris virens (Jurine, 1820)

1820 *Monoculus virens* sp. nov. L. Jurine. *Histoire des monocles qui se trouvent aux environs de Geneve*, 174, pl. 18, figs. 15-16. Geneve/Paris.
1825 *Cypris virens* (Jurine); A.-G. Desmarest, *Considerations generales sur la classe des crustaces, et description des especes de ces animaux, qui vivent dans la mer, sur les cotes, ou dans les eaux douces de la France,* 384, Paris.
1891 *Cypris (Eucypris) virens* (Jurine); W. Vavra, *Arch. Naturwissensch. Landesdurchforsch. Boehmen*, **8**(3), 102.
1900 *Eucypris virens* (Jurine); E. von Daday, *Ostracoda Hungaria*, **143**, Budapest.

Holotype: No type specimens are believed to exist.

Type locality: Not known precisely; in the surroundings of Geneva, Switzerland.

Figured specimens: Royal Belgian Institute of Natural Sciences (Brussels, Belgium), Ostracod Collection, nos. **OC 2002** (♀ LV and RV: Pl. **23**, 62, figs. 1, 2; Pl. **23**, 64, figs. 1, 4; Text-figs 1a–c, e; Text-figs. 2b–j), **OC 2003** (♀: Text-fig. 1d; Text-fig. 2a), **OC 2004** (♀ car: Pl. **23**, 62, figs. 3, 4; Pl. **23**, 64, fig. 2), **OC 2005** (♀ LV and RV: Pl. **23**, 66, figs. 1–4; Pl. **23**, 68, figs. 3, 4), **OC 2006** (♀ RV: Pl. **23**, 68, figs. 1, 2). All specimens collected on 2/3/96 from a shallow (< 20 cm) temporary pool in Ketton Quarry, Lincolnshire, England (lat. 52° 38′ N, long. 0° 33′ W), pH 8.3, temp. 9 °C.

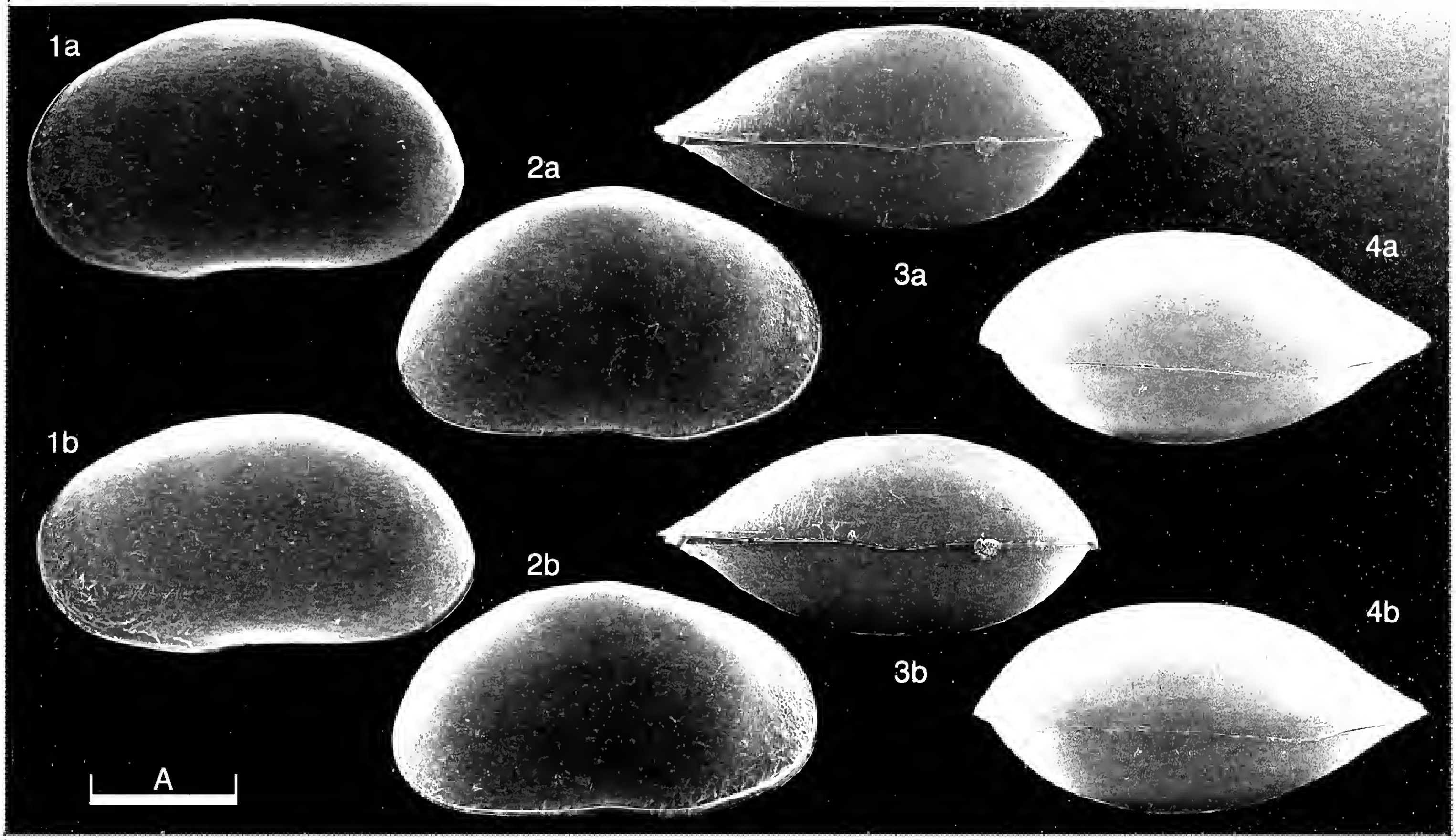
Diagnosis: Adult shell 1.6–2.3 mm long, colour green in living specimens. Viewed dorsally the carapace is more pointed anteriorly than posteriorly but lacks compressed or flattened extremities; greatest width behind midlength.

Remarks: The taxonomy of the Genus *Eucypris* s.s. is confused: intraspecific variability is high (four subspecies have been described in *E. virens*—all of these fit into the variability range of the species) and species are distinguished from each other on the shape and size of the carapace, length ratio of furcal claws and ramus, etc., not on anatomical differences. A revision of the species of *Eucypris* is urgently required (Martens and Baltanas, in prep.); the present redescription of the type species is intended as a primer to this work. Most European populations are parthenogentic, and only females are described herein. Sexual populations are known, however, from North Africa, Spain and Sicily; descriptions of males and females from sexual populations will be described in a future paper. *E. virens* is widespread and common in Europe, usually being found in temporary freshwater ponds. a review of the ecology, distribution and reproduction of this species was recently provided by A. Baltanas (*in*: D.J. Horne and K. Martens (eds), *The Evolutionary Ecology of Reproductive Modes in Non-marine Ostracoda*, Greenwich University Press, 9-16, 1994).

Acknowledgements: This work has been supported by the E.U. Human Capital and Mobility Programe (contract ERBCHRXCT/93/0253). We thank C. Behen (Brussels) for technical assistance with the line drawings.

Explanation of Plate 23, 64

Fig. 1, ♀ RV, ext. lat., detail of anterior region (**OC 2002**); fig. 2, ♀ car. post. (**OC 2004**, 1530 μm long); fig. 3, ♀ car. ant. (specimen lost); fig. 4, ♀ RV, ext. lat., detail of anterior margin (**OC 2002**).
Scale A (50 μm; ×180), fig. 1; scale b (500 μm; ×45), figs. 2, 3; scale C (20 μm; ×600), fig. 4.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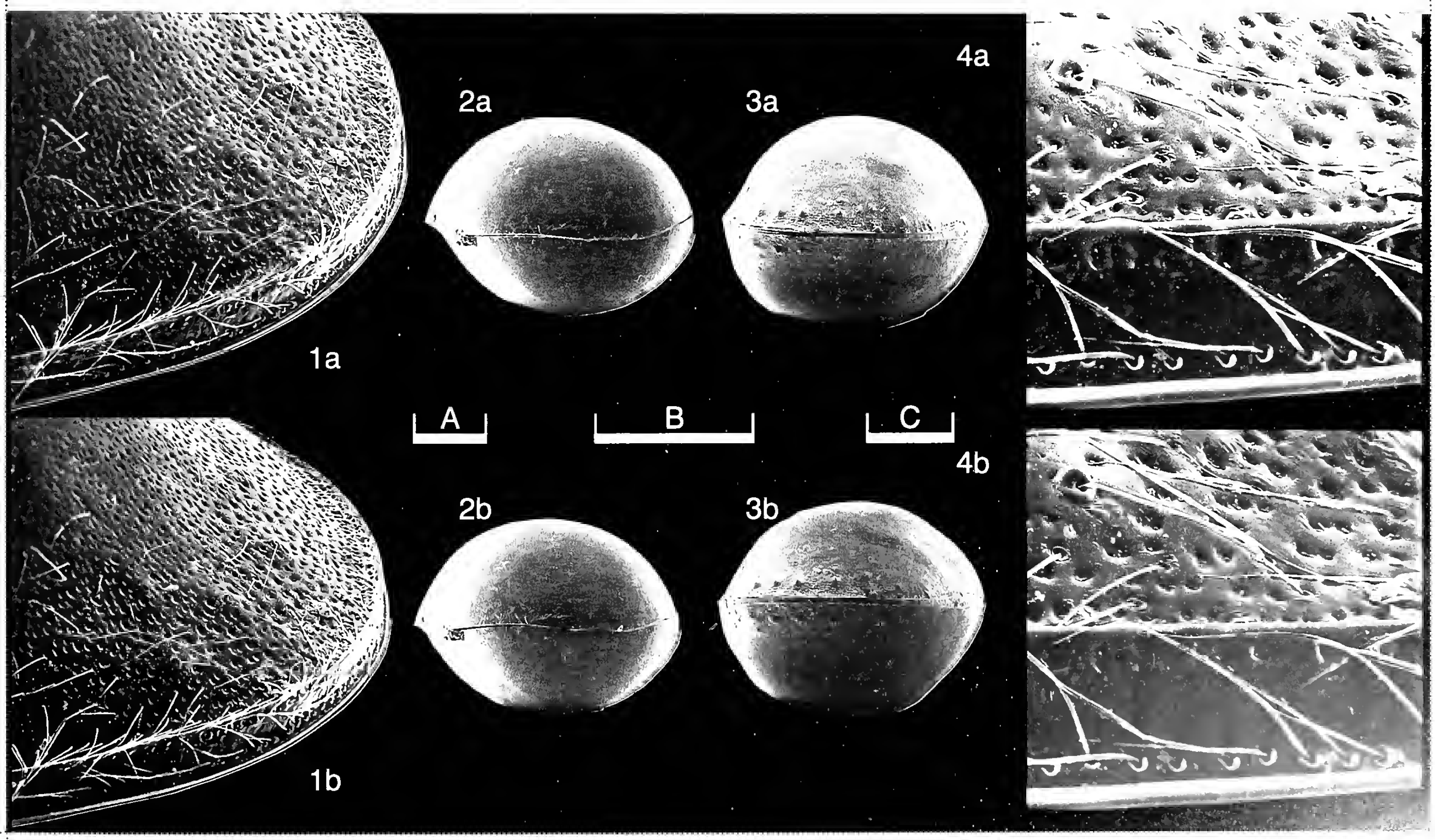
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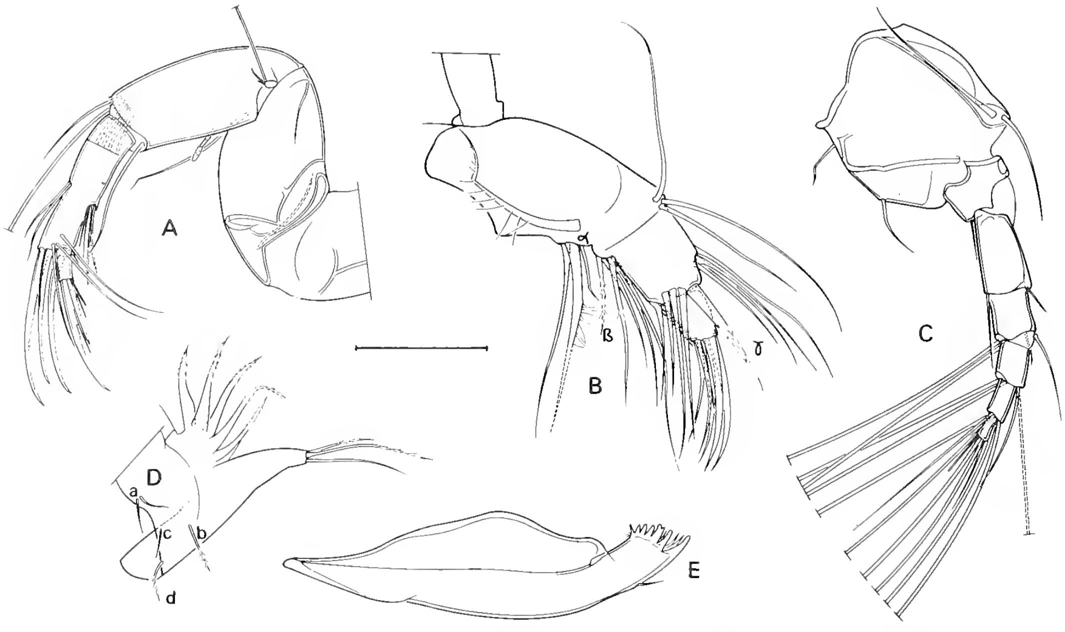
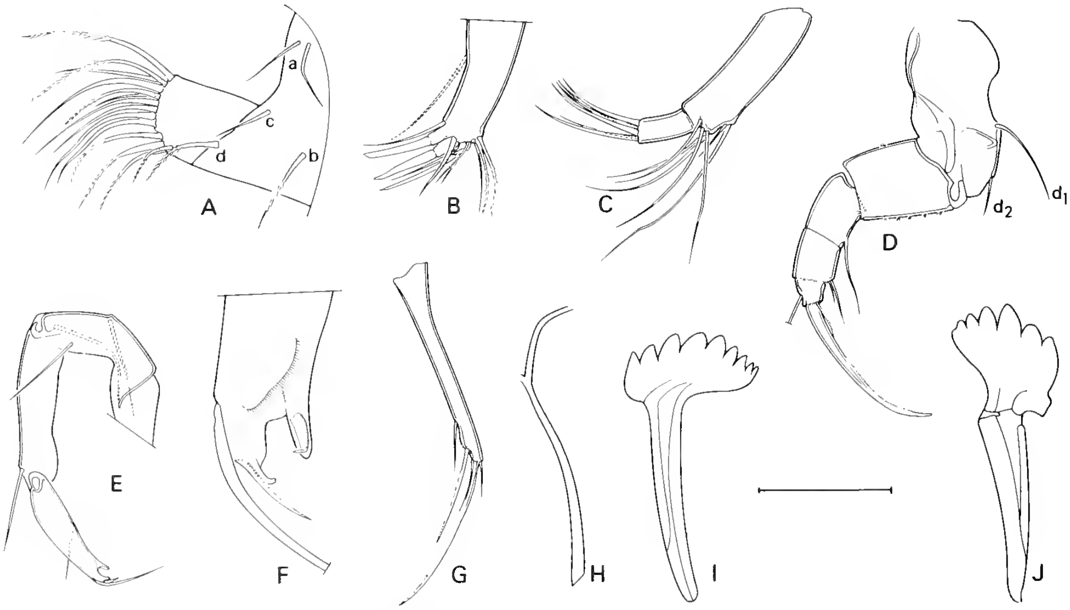


Text-fig. 1. Appendages of *E. virens*. a, A2 (**OC 2002**); b. Md-palp (**OC 2002**); c. A1 (**OC 2002**); d. M×2 (**OC 2003**); e. Md-coxa (**OC 2002**). Scale = 156 μm for a, c, d, 8 μm for b.

Explanation of Plate 23, 66

Fig. 1. ♀ LV, int. lat. (**OC 2005**, 1480 μm long); fig. 2, ♀ RV, int. lat. (**OC 2005**, 1640 μm long); fig. 3, ♀ RV, int. lat. detail of anterior calcified inner lamella (**OC 2005**), fig. 4, ♀ RV, int. lat., detail of anterior calcified inner lamella (**OC 2005**).

Scale a (500 μm; ×41), figs. 1, 2; scale B (20 μm; ×600), fig. 3; scale C (140 μm; ×70), fig. 4.

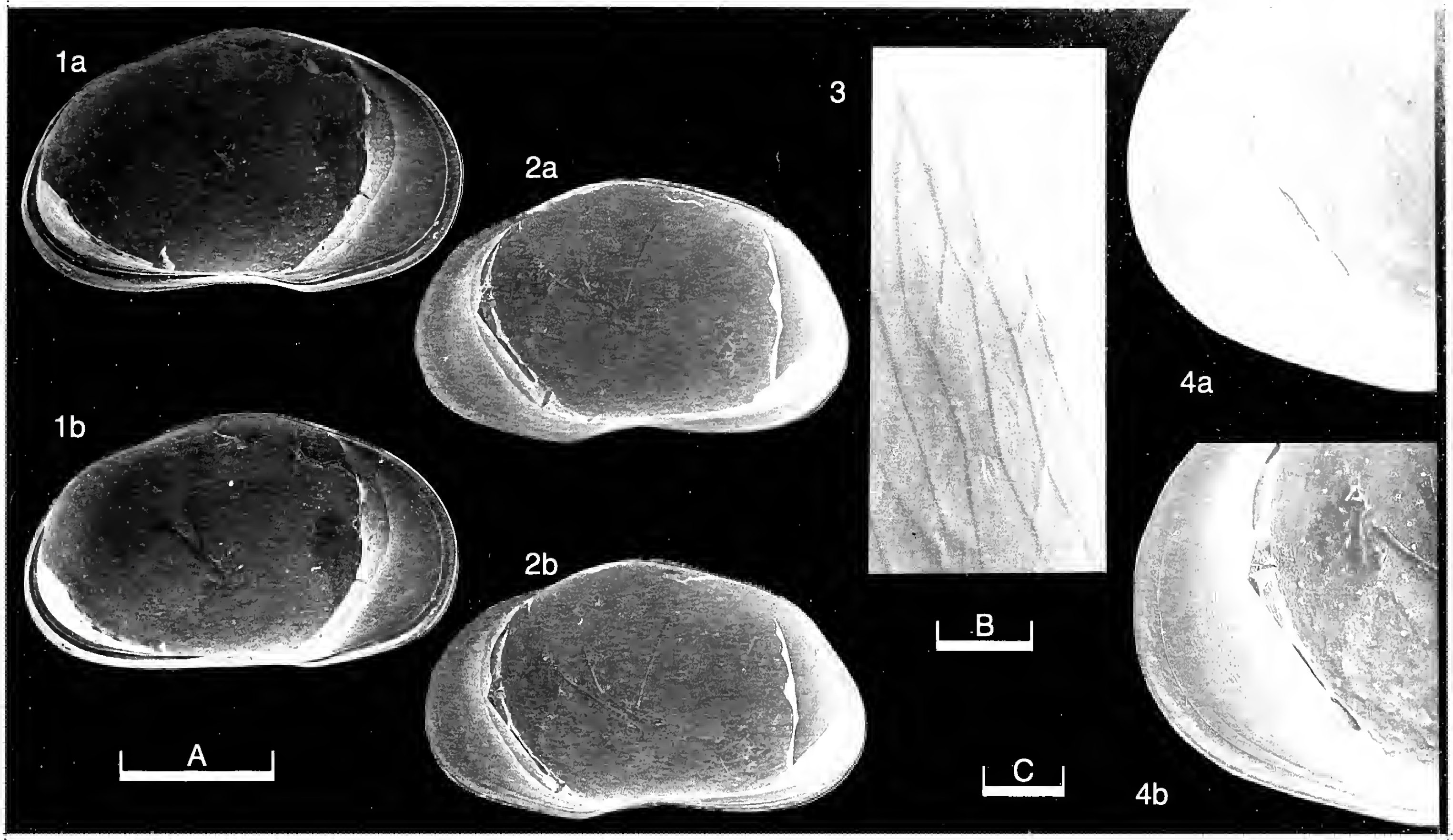


Text-fig. 2. Appendages of *E. virens*. a, M×2, detail of endopodite (**OC 2003**); b, m×2, detail of 3rd endite (**OC 2002**); c, M×2, detail of palp (**OC 2002**); d, T1 (**OC 2002**); e. T2 (**OC 2002**); f, T2, detail of apical chaetotaxy (**OC 2002**); g, furca (**OC 2002**); h, furcal attachment (**OC 2002**); i, rake-like organ (**OC 2002**); j, rake-like organ (**OC 2002**). Scale = 81 μm for a–c, 156 μm for d, e, g, h and 33 μm for f, i, j.

Explanation of Plate 23, 68

Fig. 1. ♀ RV, int. lat. (**OC 2006**, 1460 μm long); fig. 2, ♀ RV, int. lat., detail of adductor musc. sc. (**OC 2006**), fig. 3, ♀ RV, int. oblique (**OC 2005**, 1460 μm long), fig. 4, ♀ LV, int. oblique (**OC 2005**, 1480 μm long).

Scale A (500 μm; ×37), fig. 1; scale B (70 μm; ×50), fig. 2; scale C (500 μm; ×42), figs. 3, 4.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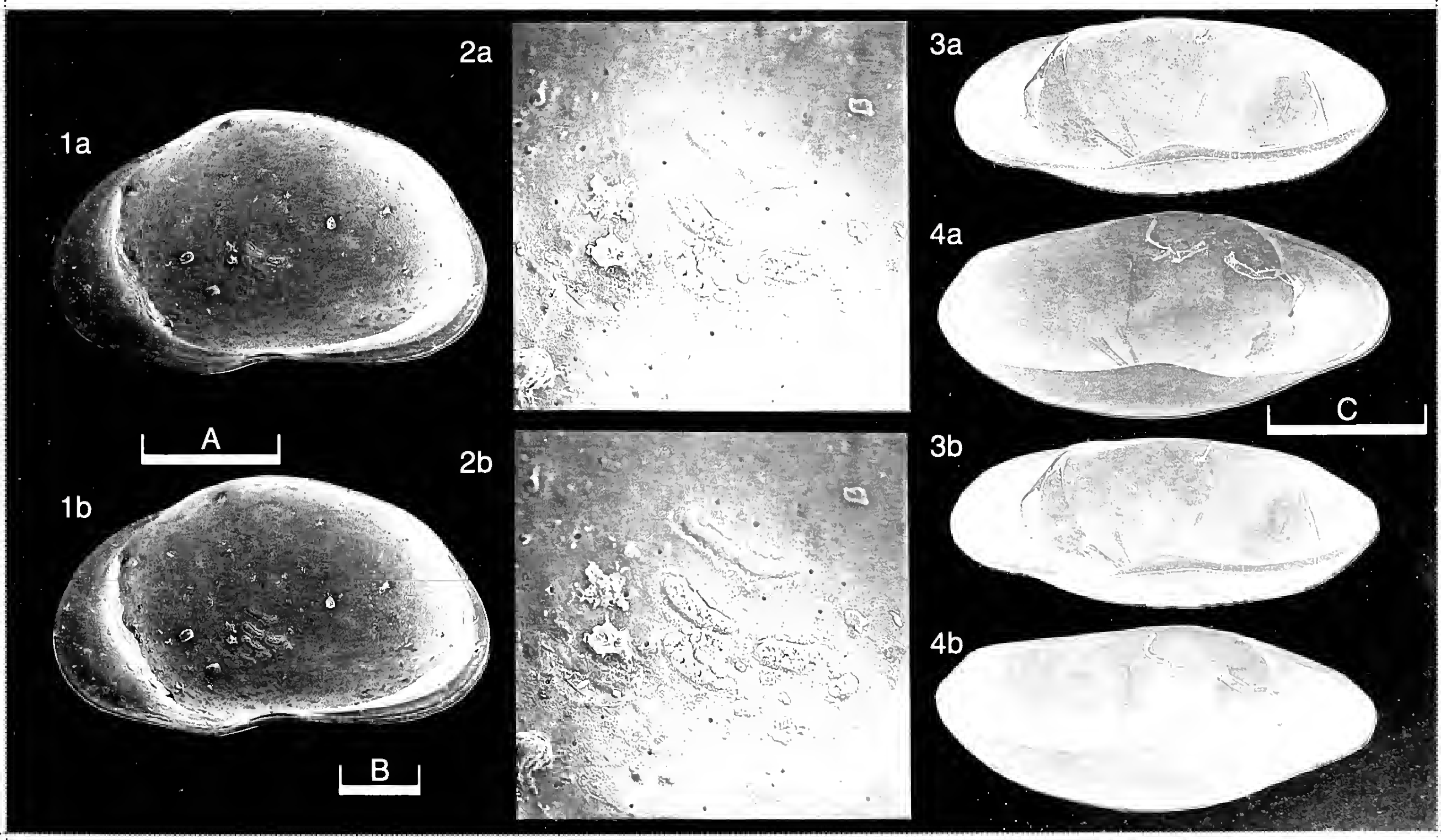
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595.336 (113.312) (438 : 161.018.54) : 551.351 + 552.55

ON *BALTONOTELLA KUCKERSIANA* (BONNEMA)

by Roger E.L. Schallreuter
(University of Hamburg, Germany)

Genus BALTONOTELLA Sarv, 1959

Type-species (by orginal designation): *Macronotella kuckersiana* Bonnema, 1909

Diagnosis: Median-sized. Shape very high. Amplete or subamplete. Right valve/left valve overlap. Right valve with marginal row of spines, at least anteroventrally. Except for adductorial muscle spot and sometimes other regions, the outer surface has elongate puncta and tiny pores in between. Contact margin of right valve has a distinct outer list and inner furrow which is delimited on inner side by a row of denticles. A row of pores occurs near free margin.

Remarks: The distinction between *Baltonotella* and *Brevidorsa* Neckaja, 1973 is difficult (see N. Sidaraviciene, *Ordovician ostracodes of Lithuania*, 179, 1992; Vilnius), and some authors consider them synonymous (T. Meidla, *Late Ordovician Ostracodes of Estonia*, 95, 1996; Inst. Geol. Tartu). Moreover, the occurrence of a centroventrally reduced marginal row of spines in the ventral regions of species such as those placed in *Brevidorsa* and *Hyperchilarina* Harris, 1957 was hitherto unknown in *Baltonotella* and makes the differentiation of these genera even more problematic.

The type-species of *Baltonotella* and *Brevidorsa* are quite different but other species form a transitional series between the two genera in nearly all features. Typical species of *Brevidorsa*, for example, are characterized by smooth shells with pillar sculptures near the free margin of the smaller left valve which may form a reflected image of the marginal sculpture if present (R.E.L. Schallreuter, *Geol. För. Stockh. Förh.*, **95**, fig. 5, 1973; J. Vannier, *Lethaia*, **23**, fig. 1, 1990). Other species show both pillar sculptures and puncta (S.M. Warshauer and J.M. Berdan, *U.S. Geol. Surv. Prof. Pap.*, **1066** (H), pl. 10, fig. 15, 1982; R.E.L. Schallreuter, *Geol. Paläont. Westfalen*, **34**, pl. 10B, fig. 1, 1995; M. Williams and J. Vannier, *J. Micropaleontol.*, **14**, pl. 1, fig. 2, 1995). A row of denticles on the inner side of the contact margin of the right valve also occurs in impunctate species placed in *Hyperchilerina* or *Brevidorsa* (R.E.L. Schallreuter, 1973, *op. cit.*, fig. 3d-E; Vannier, 1990, *op. cit.*, fig. 2). Puncta are characteristically elongate in *B. kuckersiana* and are variably developed in congeneric species (M. Williams and J. Vannier, 1995, *op. cit.*, pl. 1, figs. 2, 6–8).

Libumella Rozhdestvenskaya, 1959 (*in*: E.V. Chibrikov and A.A. Rozhdestvenskaya, *Ostracody terrigennoy tolschchi Devona zapadnoy Bashkirii*, Moscow) and *Akkermites* Melnikova, 1980 (*Paleontol. Zhurn.*, 58–64, Moscow) are also closely related and may be synonyms of one or other of the genera mentioned above.

Explanation of Plate 23, 70

Figs. 1–3, RV (**AGH G162-1**, 1.17 mm long): fig. 1, ext. lat.; fig. 2, int. dorsolat.; fig. 3, int. lat.
Scale A (250 μm; ×50), fig. 1; scale B (250 μm; ×60), figs. 2, 3.

Baltonotella kuckersiana (Bonnema, 1909)

1909 *Macronotella Kuckersiana* nov. spec. J.H. Bonnema, *Mitt. Miner.-Geol. Inst. Groningen*, **2**(1), 55, 56, 76, pl. 3, figs. 1–9.
1911 *Macronotella kuckersiana* Bonnema; R.S. Bassler, *Bull. U.S. Nat. Mus.*, **77**, 23.
1934 *Macronotella kuckersiana* Bonnema; R.S. Bassler & B. Kellett, *Geol. Soc. Am. Spec. Pap.*, **1**, 54, 407.
1937 *Macronotella ? kukersiana* Bonnema; A. Öpik, *Ann. etc. Natur. Soc. Tartu Univ.*, **43**(1/2), 71 and *Publ. Geol. Inst. Univ. Tartu*, **50**, 7.
1937 *Leperditella lenticula* n.sp. A. Öpik, *ibid.*, 69, 73(5, 9), pl. 13, figs. 18–19.
1937 *Macronotella ?* sp. *a.* (sine nom.); A. Öpik, *ibid.*, 69, 87(5, 23), pl. 15, fig. 6.
1940 *Macronotella (?) kuckersiana* Bonn. and Öpikella sp. *a* (Öpik); P. Thorslund, *Sver. Geol. Unders. (C)*, 436, 181, 186.
1955 *Macronotella kuckersiana* (Bonnema); L.I. Sarv, *Fauna ostrakod ordovika Estonskoj SSR, Avtoref. diss.*, table 2 (p. 12).
1956 *Macronotella kuckersiana* Bonnema; L. Sarv *in* D. Kaljo *et al.*, *Loodusuurijate selts Eesti NSV Teaduste Akad. juures, Abiks loodusevaatlejale*, **25**, 50.
1959 *Baltonotella kuckersiana* (Bonnema, 1909); L.I. Sarv, *Eesti NSV Teaduste Akad. Geol. Inst. Uurimused*, **4**, 161, 162, 163, table 2 (p. 190), pl. 32, figs. 17–20.
1970 *Baltonotella kuckersiana* (Bonnema); A. Roomusoks, *Stratigrafija viruskoj i char'yuskoj serij (ordovik) Severnoj Estonii*, **1**, table 10 (p. 178).
1974 *Macronotella kuckersiana*; V. Nestor, *Cat. Paleont. Coll.*, 14.
1983 *Baltonotella kuckersiana*; R.E.L. Schallreuter, *Palaeontographica (A)*, **180**, 165.
1987 *Baltonotella* sp.; R.E.L. Schallreuter, *N. Jb. Geol. Paläont. Abh.*, **174**(1), 25.
1990 *Baltonotella kuckersiana* (Bonnema, 1909). A.F. Abushik *in* A.F. Abushik *et al.*, *Prakticheskoe rukovodstvo po mikrofaune SSSR*, **4**, 123, 147, pl. 41, fig. 2a-v.
1992 *Baltonotella kuckersiana* (Bonnema, 1909); N. Sidaraviciene, *op. cit.*, 180, 247, table 2 (p. 217), pl. 45, fig. 5.
1996 *Baltonotella kuckersiana* (Bonnema, 1909); N. Sidaraviciene, *Lietuvos ordoviko ostrakodai, biostratigrafija*, table **4**, fig. 7 (faunal log).

Lectotype: Institute of Geology, Estonian Academy of Sciences, Tallinn, no. **Os 2066**; carapace. Designated by Sarv 1959, *op. cit.*, 162.

Type locality: Kukruse, Estonia; lower part of Kukruse stage (C2α), middle Ordovician.

Diagnosis: Valves up to 1.39 mm long. Smaller left valve with marginal row of spines at least in the anteroventral region but without pillar sculptures. Many of elongate puncta occur in rows parallel to the borders.

Figured specimens: Archiv für Geschiebekunde, Geologisch-Paläontologisches Institut und Museum, University of Hamburg (**AGH**), Germany, nos. **G162-1** (RV: Pl. **23**, 70, figs. 1–3; Pl. **23**, 72, figs. 2–4) and **G162-2** (LV: Pl. **23**, 72, fig. 1). Both from Backsteinkalk erratic boulder no. Jas 17, from Rixhöft (Jastrzebia Góra), N Pomerellen, N Poland; long. 18° 18′ E, lat. 54° 51′ N (Schallreuter 1987, *op. cit.*, 24, 25, 36). Idavere stage (C3) or Johvi stage (D1), Ordovician.

Remarks: In contrast to the surface puncta the pores go through the shell and are therefore visible also on the inner side of the valve (= normal pore canals, flächenständige porenkanäle; Pl. **23**, 70, fig. 1, Pl. **23**, 72, figs. 1, 2). A row of pores is present near the free margin (radial pore canals, randständige porenkanbäle; Pl. **23**, 72, figs. 3, 4).

Macronotella lenticularis Kummerow, 1924 (*Jb. Preuß. Geol. Landesanstalt*, **44**, 433) is not (as was assumed by Sarv, 1959, *op. cit.*, 162) considered to be a synonym of *B. kuckersiana*.

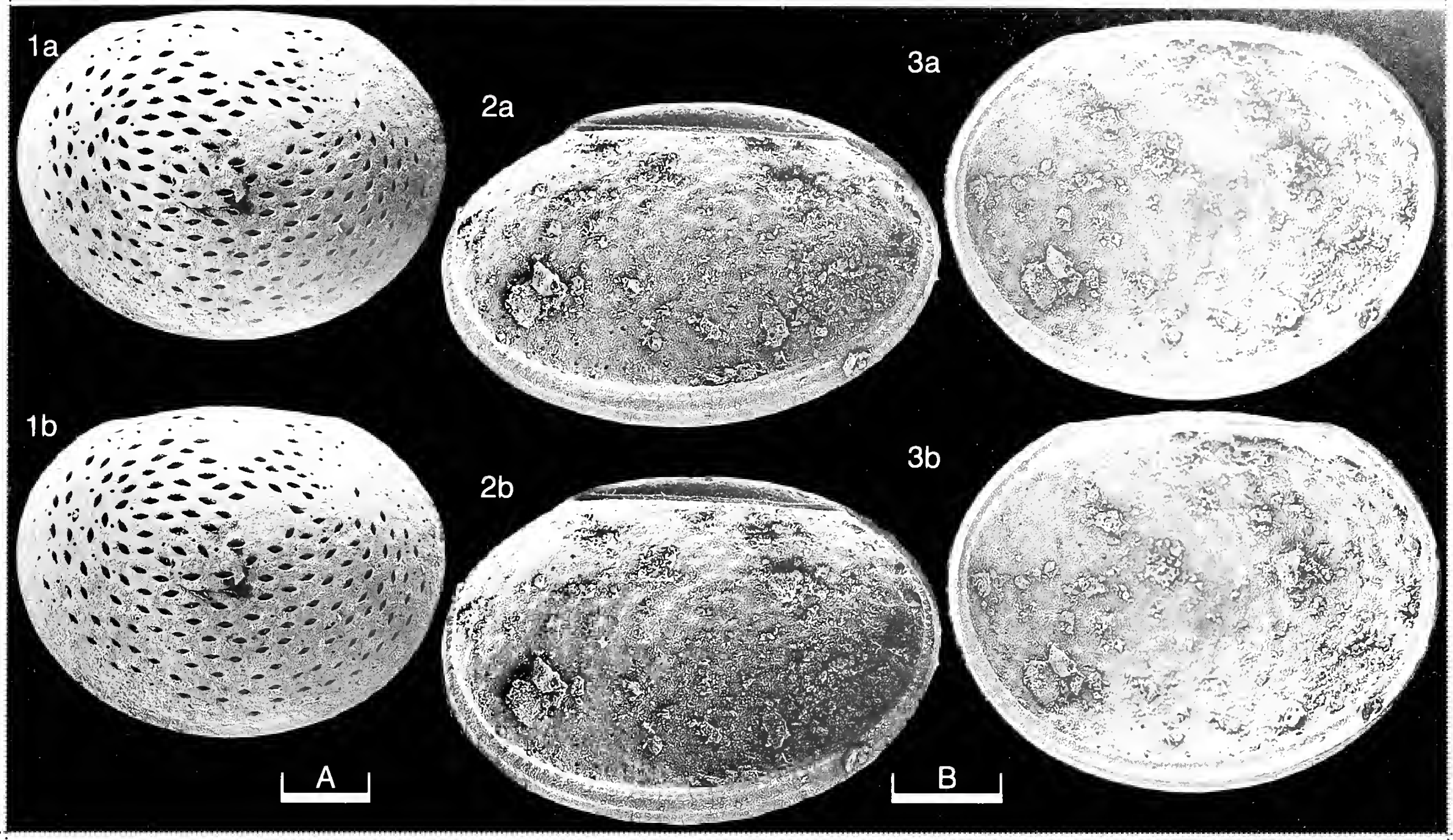
B. elegans (Harris, 1931) (*Bull. Okla. Geol. Surv.*, **55**,) differs from *B. kuckersiana* in having fewer puncta.

Distribution: Middle Ordovician. Kohtla substage of Kukruse stage (C2α), Estonia. Middle part of Idavere stage, Lithuania. Geschiebes of Lower Lundibundus limestone of Tvären, central Sweden (Thorslund, 1940). Backsteinkalk geschiebes (Baltic and intermediate types) of N central and S northern Europe (Schallreuter 1983, 1987).

Explanation of Plate 23, 72

Fig. 1, LV, ext. lat. (post. incomplete) (**AGH 162-2**, 0.97 mm long). Figs. 2–4, RV (**AGH 162-1**, 1.17 mm long): fig. 2, int. lat. detail of post. part; fig. 3, ext. vent. detail; fig. 4, ext. vent.

Scale A (100 μm; ×63), fig. 1; scale B (100 μm; ×120), fig. 2; scale C (50 μm; ×130), fig. 3; scale D (100 μm; ×60), fig. 4.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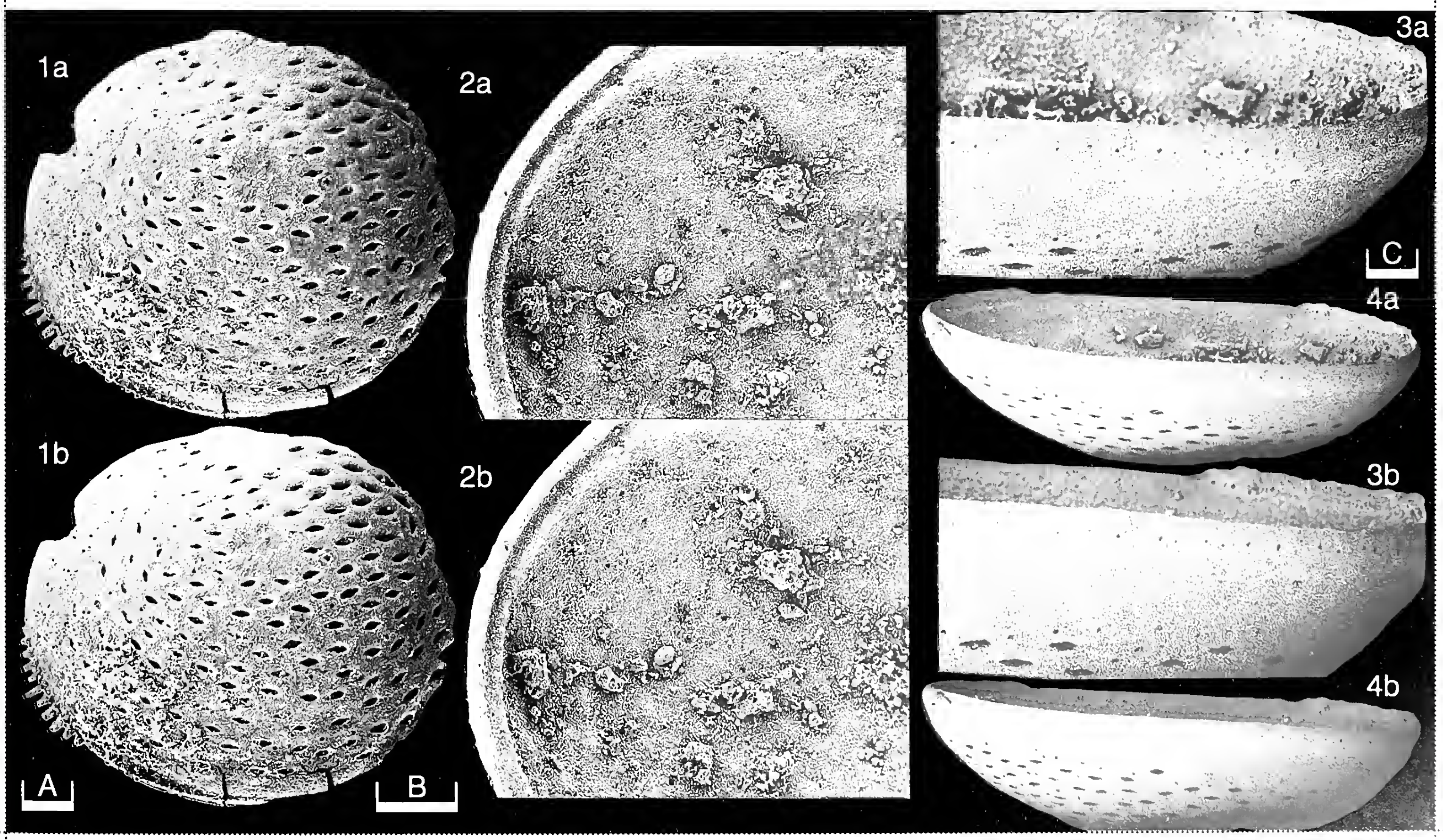
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Stereo-Atlas of Ostracod Shells 23 (16) 73–76 (1996)
595.336.21 (113.312) (430 : 161.008.54) : 551.351 + 552.55

ON *KARINUTATIA REN* SCHALLREUTER

by Roger E. L. Schallreuter
(University of Hamburg, Germany)

Karinuatia ren Schallreuter, 1984

1984 *Karinutatia ren* n. sp. R.E.L. Schallreuter, *N. Jb. Geol. Paläont. Abh.*, **169(1)**, 25, 26, fig. 1.4.
1986–7 *Karinutatia ren* Schallreuter, 1984E; E.K. Kempf, *Geol. Inst. Univ. Köln Sonderveroeff.*, **50**, 423; **51**, 497; **52**, 761.
1990 *Karinutatia ren* Schallreuter, 1984; R.E.L. Schallreuter, *Fossilien von Sylt*, **3**, 255, table 3.

Holotype: Archiv für Geschiebekunde, Geologisch-Paläontologisches Institut und Museum, University of Hamburg, Germany, no. **GPIMH 2918**, ♀ RV.

Type locality: Former gravel pit in the Keitumer Heide, between Braderup and Munkmarsch, Isle of Sylt, North Sea; approximately lat. 54° 56′ N, long. 8° 210′ E. Geschiebe (glacial erratic boulder) of the Sy167-type of the *Lavendelblaue Hornsteine*; Johvi stage (D1), upper Viruan, middle Ordovician. The geschiebe is found in the Kaolinsand (Plio/Pleistocene), with a provenance presumably from the northern central Baltic Sea or further NE (S Bottnicum, Finland).

Diagnosis: Valves up to at least 0.50 mm long. Shape rather long, with ventricular concavity. Posterior cardinal angle distinctly greater than 90°. Adductorial pit elongate, drop-like. Dominatium with two loculi. Shell reticulation rather coarse to very coarse, lumina irregularly orientated.

Explanation of Plate 23, 74

Figs. 1, 2, ♀ RV (**AGH G163-1**, 0.45 mm long): fig. 1, ext. lat.; fig. 2, int. lat.
Scale A (50 μm; ×205), figs. 1, 2.

Figured specimens: Archiv für Geschiebekunde, Geologisch-Paläontologisches Institut und Museum, University of Hamburg (**AGH**), Germany, nos. **G163-1** (♀ RV: Pl. **23**, 74, figs. 1, 2), **G163-2** (♀ RV: Pl. **23** 76, fig. 1), and **G163-3** (tecnomorphic RV: Pl. **23**, 76, fig. 2).

All from *Lavendelblaue Hornstein* geschiebe (Sy-167-type), nos. Sy-224A (**G163-1, G163-2**) and Sy-303 (**G163-3**), from the type locality. All specimens are silicified.

Remarks: This species is characterized by domatial domiciliar dimorphism. Two large loculi occur close to the posterior end of the carapace (Pl. **23**, 74, fig. 2), thus invoking the kind of egg care found in the Recent genus *Cytherella* (see Jaanusson V., *Lethaia*, **18**, 81, 1985).

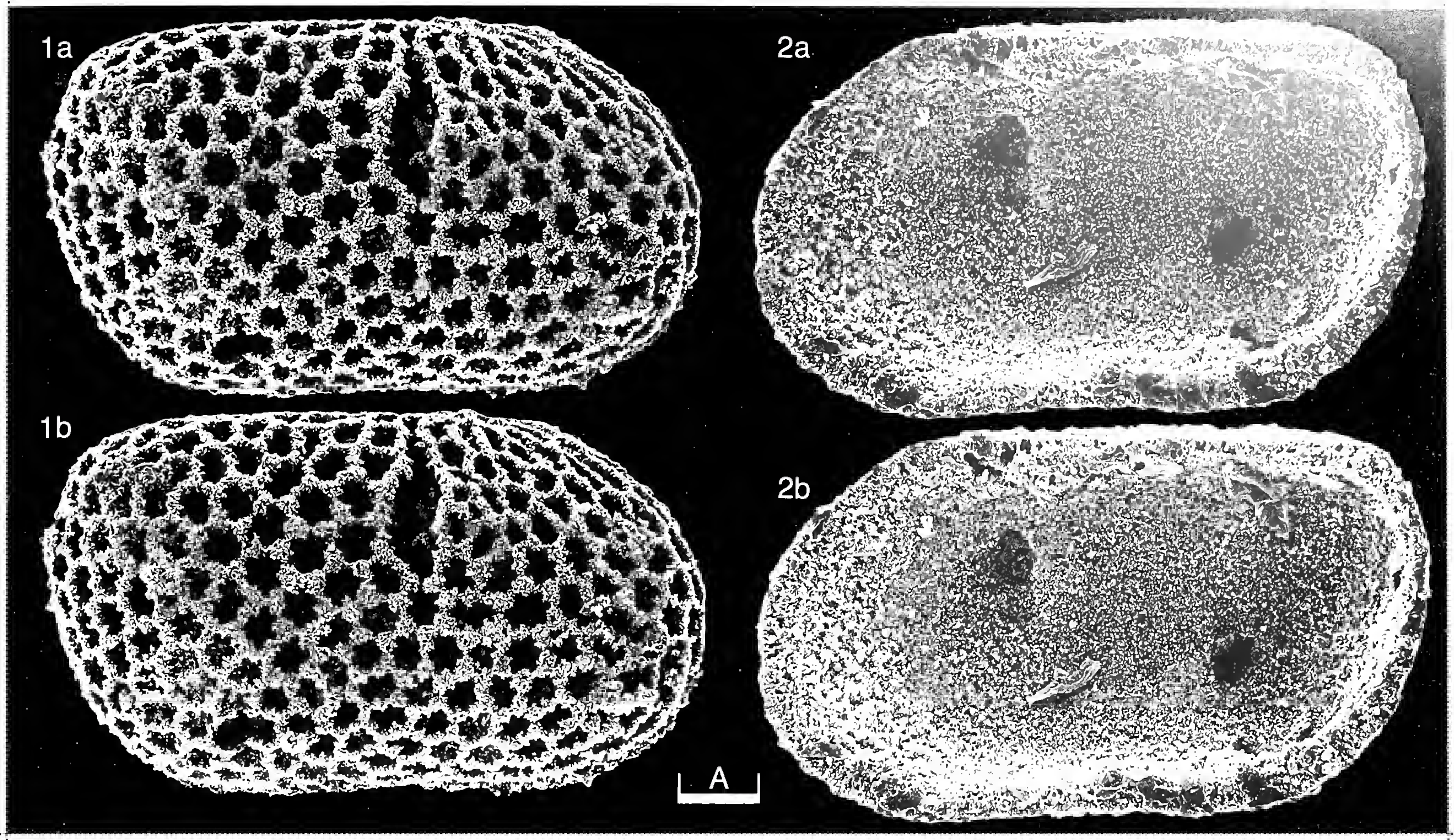
The type-species, *K. crux* Schallreuter, 1978 (*Stereo-Atlas Ostracod Shells*, **5**(1), 6, 1978), has three loculi in the domatium and is therefore longer in the posterior part of the female valve. *K. crux* also differs by its larger size (up to 0.64 mm long), its posterior cardinal angle (of about 90°), and by having a weak or absent ventricular concavity and fine reticulation with lumina which are orientated in parallel rows between elongate ridges.

Domatial dimorphism also occurs in *Domaszevicella* Olempska (*Palaeont. Polon.*, **53**, 196, 1994) and the very similar, also triloculate (synonymous ?) *Loculocavata* Lundin, Williams and Siveter (*J. Paleont.*, **69**(5), 1890, 1955). *Domaszevicella* was placed within the Monotiopleuridae, Order Platycopa, whereas *Loculocavata* was considered to be a member of the Leperditellidae, Order Palaeocopida. The problems connected with the suprafamilial classification of such forms were discussed by Lundin *et al.* (*op. cit.*). In any event, the domatial forms (especially *K. ren*) are more closely related to typical platycopes than to typical palaeocopes (which are characterized by the widely occurring velar dimorphism).

Distribution: Very rare: only 4 specimens known. Middle Ordovician glacial erratic boulders of Sy-167 type of the *Lavendelblaue Hornstein*, from the Plio-/Pleistocene Kaolinsand of the Isle of Sylt (geschiebe Sy-167, Sy-224A, and Sy-303).

Explanation of Plate 23, 76

Fig. 1, ♀ RV, ext. lat. (**AGH G163-2**, 0.50 mm long). Fig. 2, tecnomorphic RV, ext. lat. (**AGH G163-3**, 0.39 mm long).
Scale A (50 μm; ×185), fig. 1; scale B (50 μm; ×235), fig. 2.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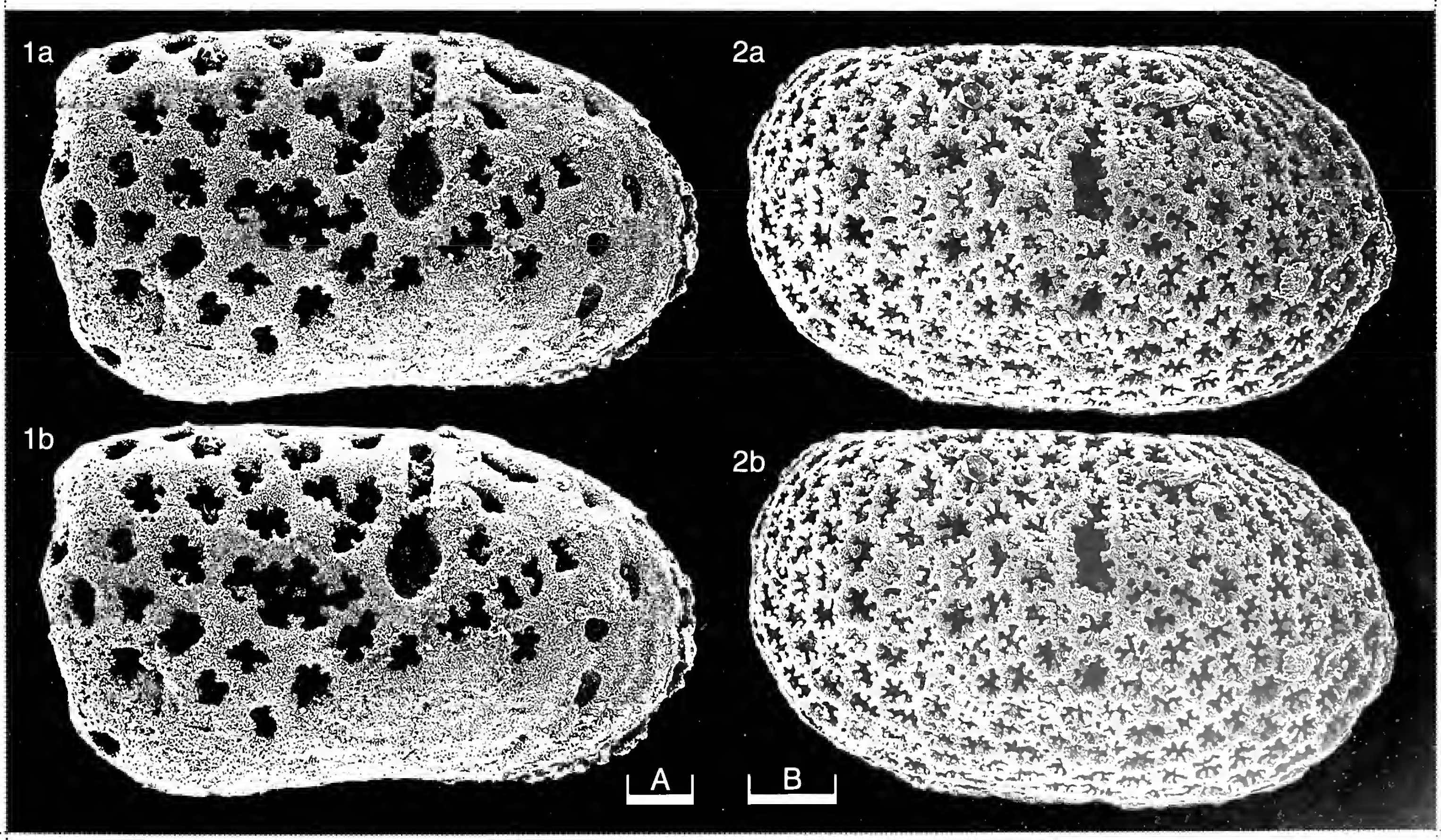
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ON *SOANELLA OVALIS* (IVANOVA)

by Roger E.L. Schallreuter
(University of Hamburg, Germany)

Soanella ovalis (Ivanova, 1955)

1955 *Tetradella ovalis* Ivan.; O.I. Nikiforova, *Polevoi atlas ordovikskoj i silurijskoj fauny Sibirskoj platformy*, 16.
1955 *Tetra ovalis* sp. nov. V.A. Ivanova, *Ibid.* 114, 182, pl. 20, fig. 6.
1963 *Tetradella ovalis* V. Ivanova; E.I. Mjakova, *Stratigrafiya ordovikskich i silurijskich otlozhenij doliny reki Mojero*, table 1 (p. 36).
1966 *Tetradella ovalis* V. Ivan.; O.I. Nikiforova and O.N. Andreeva *in* I.I. Krasnova *et al.* (Eds.), *Geologiya Sibirskoj platformy*, 66.
1967 *Soanella ovalis* (V. Ivanova); A.V. Kanygin, *Ostrakody ordovika gornoj sistemy Cherskogo*, 94.
1972 *Soanella ovalis* and *Tatradella ovalis* V. Ivanova; V.A. Ivanova, *Katalog originalov Ostrakody*, 82, 85.
1973 *Quadrilobellina ovalis* (V. Ivanova, 1955); A.I. Neckaja, *Trudy VNIGRI*, **324**, 35, 36, 72.
1974 *Soanella ovalis* (V. Ivanova), 1955; G.R. Kolosnitsyna *in* L.V. Ogienko *et al.*, *Biostratigrafija kembrijskich i ordovikskich otlozhenij juga Sibirskoj platformy*, 98, 198, pl. 33, figs. 16.
1975 *Soanella ovalis* (V. Ivan.); G.R. Kolosnitsyna *in* Yu. I. Tesakov, *Trudy IGiG*, **200**, 234, table 5 (p. 47).
1979 *Soanella ovalis* (V. Ivanova, 1955); V.A. Ivanova, *Trudy PIN*, **172**, 179, 181, 182, 192, pl. 16, fig. 9.
1986–7 *Soanella ovalis* (V. Ivanova, 1955A) Kanygin, 1967A and *Tetradella ovalis* Ivanova, 1955B; E.K. Kempf, *Geol. Inst. Univ. Köln Sonderveroeff.*, **50**, 698, 713, **51**, 422, **52**, 298, 484.
1990 *Quadrilobellina* Neckaja, 1973; A.F. Abushik *et al.*, *Prakticheskoe rukovodstvo po mikrofaune SSSR*, **4**, 178.

Holotype: Institute of Palaeontology, Russian Academy of Sciences, Moscow (PIN), no. **1542/6**; right valve.
Type locality: River Dzherba, basin of the River Lena, central Siberia; Volginian, lower Krivolukian, middle Ordovician.

Explanation of Plate 23, 78

Fig. 1, RV, ext. lat. (**MB O.227**, 2.40 mm long). Figs. 2, 3, RV (**MB O.228**, 2.85 mm long): fig. 2, ext. lat.; fig. 3, ext. vent. Fig. 4, RV, int. lat. (**MB O.229**, 2.01 mm long).
Scale A (500 μm; ×26), figs. 1, 4; scale B (500 μm; ×22), figs. 2, 3.

Figured specimens: Museum für Naturkunde, Berlin, Germany (**MB**), nos. **O.224** (LV: Pl. **23**, 80, figs. 1, 2). **O.225** (LV: Pl. **23**, 80, fig. 3), **O.226** (LV: Pl. **23**, 80, fig. 4), **O.227** (RV: Pl. **23**, 78, fig. 1), **O.228** (RV: Pl. **23**, 78, figs. 2, 3) and **O.229** (RV: Pl. **23**, 80, fig. 4).

All from D'yukunak: boring 1–4, depth 135.1 m; Morkoka river, Siberian platform; approximately lat. 64° 45′ N, long. 62° 30′ E. Volginian, lower Krivolukian, middle Ordovician.

Diagnosis: Up to 4.00 mm long (holotype: 3.00 mm long). Asymmetrical in lateral view: L2 distinctly shorter than L3, but also connected with the other lobes by a connecting lobe which is ventrally rather weak. Posterior lobe nearly perpendicular to straight dorsal margin. Velum weak, broadest anteriorly, so that the valve is more pointed anteriorly than posteriorly.

Remarks: *S. ovalis* is very similar to the type species, *S. maslovi* (Ivanova, 1955) (cf. Ivanova 1979, pl. 16, figs. 9a, 10), which is larger (5.5 mm long; see Kanygin, 1984, *Trudy Inst. Geol. Geofiz. Sibirsk. otd., Akad. nauk SSSR(OGiG)*, **590**, pl. 21, fig. 8) and has a longer L2 (Kanygin, 1967, *op. cit.* pl. 17, figs. 6, 7 and 1984; Ivanova, 1979, *op. cit.* 182). Furthermore, if the holotypes are compared, *S. ovalis* seems to be more pointed anteriorly.

S. symmetrica Kanygin, 1967 (*op. cit.* p. 96) reaches the same size as *S. ovalis* but is characterized by having symmetrically arranged lobes (L2 and L3 are of nearly equal length). In *S. ampla* Kanygin, 1967 (*op. cit.* p. 97) the posterior lobes are more oblique to the straight dorsal margin. In *S. aurita* (Ivanova, 1955) and *S. stricta* Kolosnitsyna *in* Ogienko *et al.*, 1974 L2 is also distinctly shorter than L3 but is not confluent with the connecting lobe. In *S. arca* Kolosnitsyna, 1974 both L2 and L3 are separated from the connecting lobe.

Tetradella ovalis is the type-species of *Quadrilobellina* Neckaja, 1973, a genus which is, *a priori*, a synonym of *Soanella* because Neckaja also included the type-species of *Soanella* in her genus.

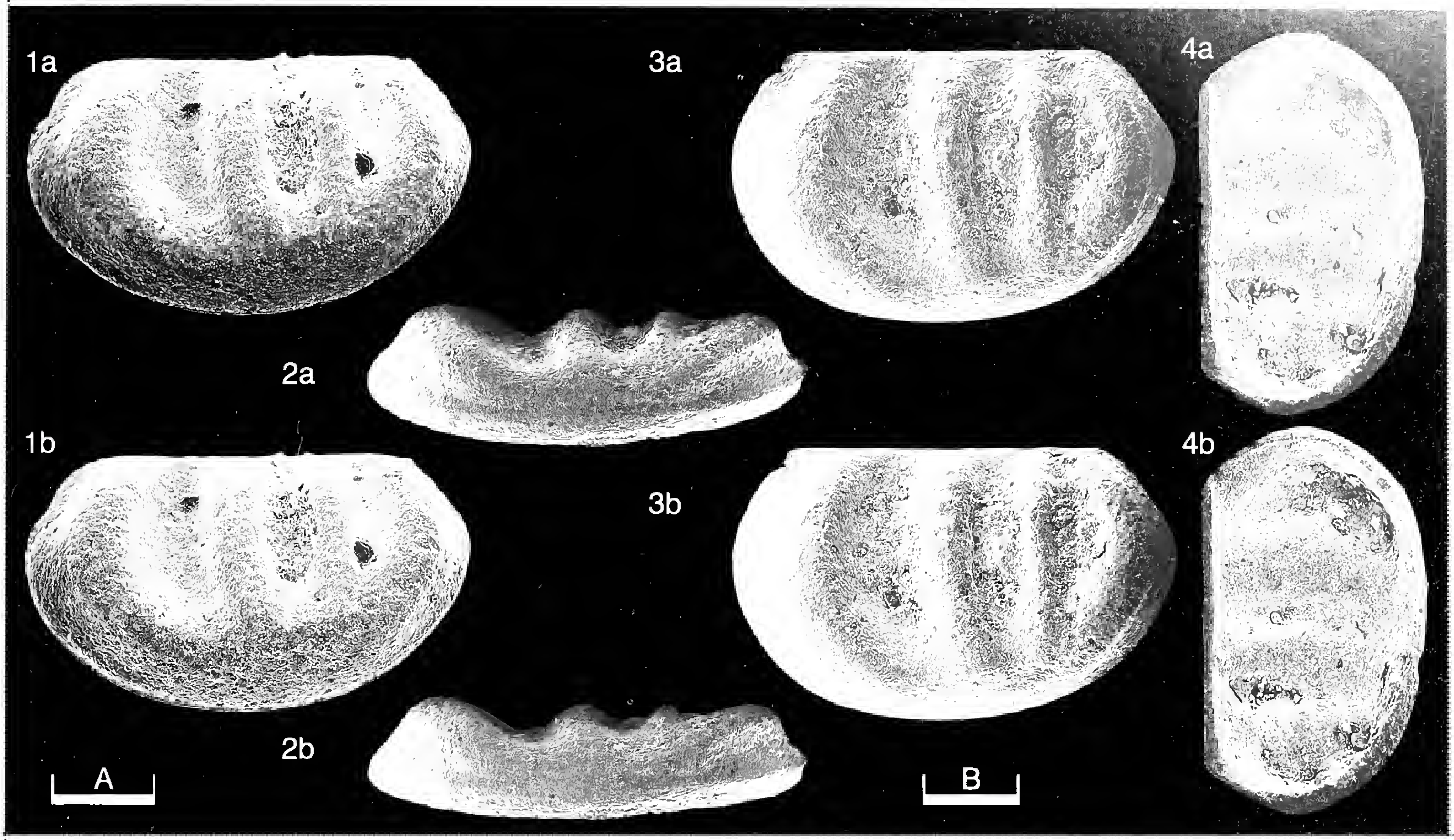
Soanella is type of the Soanellinae, which were characterized as having unequal valves, quadrilobation and lacking adventral sculptures and dimorphism (Kanygin, 1971, *Trudy Inst. Geol. Geofiz. Sibirsk. otd., Akad. Nauk SSSR (IGiG)*, **128**, 71, 80).

Compared to *Soanella, Fidelitella* Ivanova, 1960 has more marked ventral thickening of the left valve and more markedly developed asymmetry of its lobation (see Schallreuter and Kanygin, *Stereo-Atlas Ostracod Shells*, **19**, 37–40, 1992).

Distribution: River Lena basin: rivers Dzherba, Nyuya, Lena (der. Polovinka), and Mojero. Volginian, lower Krivolukian, middle Ordovician.

Explanation of Plate 23, 80

Figs. 1, 2, LV (**MB O.224**, 2.92 mm long): fig. 1, ext. lat.; fig. 2, ext. vent. Fig. 3, LV, ext. lat. (**MB O.225**, 2.42 mm long). Fig. 4, LV, int. lat. (**MB O.226**, 2.43 mm long).
Scale A (500 μm; ×21), figs. 1, 2; scale B (500 μm; ×25), fig. 3; scale C (500 μm; ×22), fig. 4.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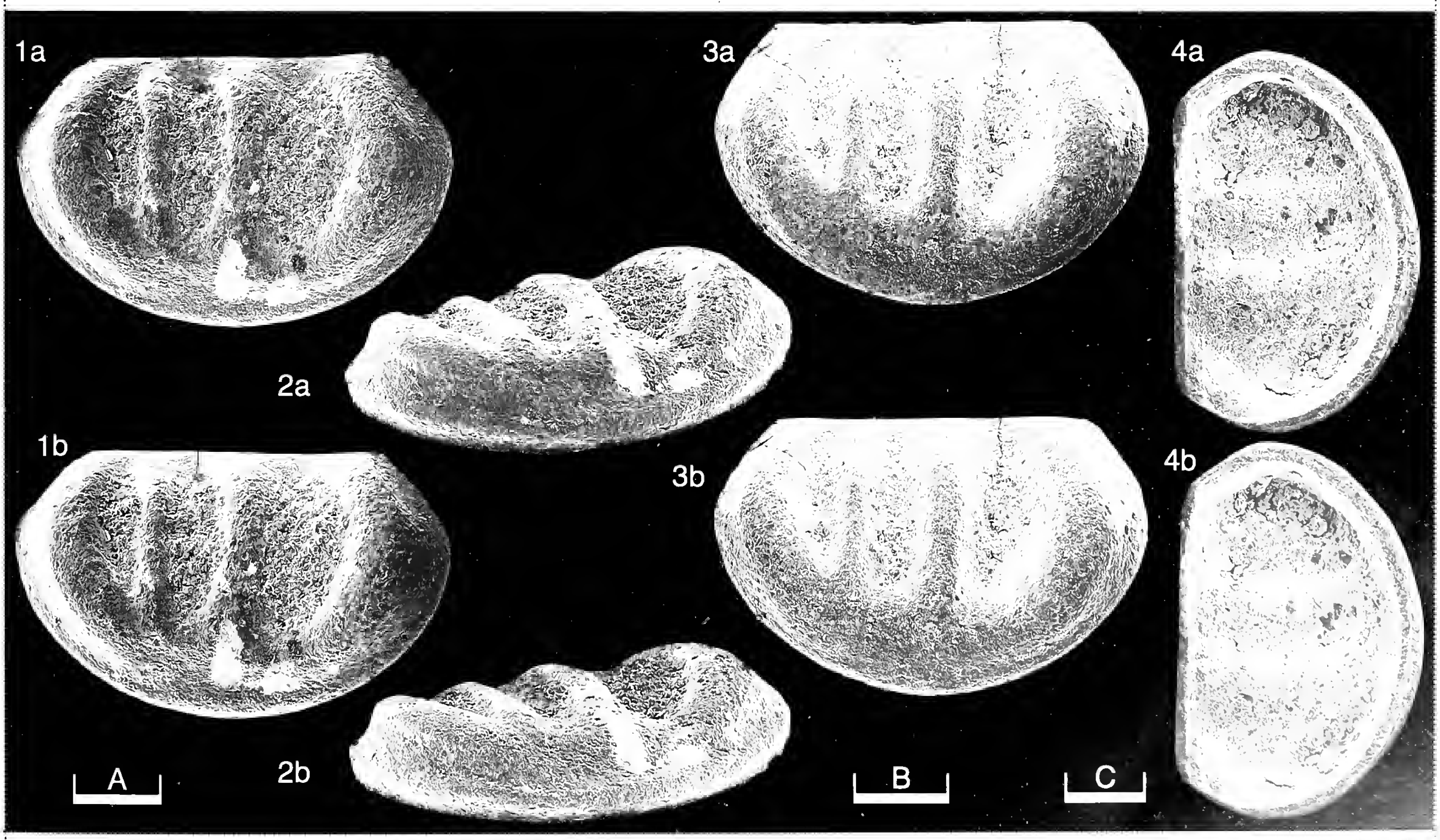
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C

ON *VALENTELLA COSTATA* (IVANOVA)

by Roger E.L. Schallreuter
(University of Hamburg, Germany)

Genus *VALENTELLA* Neckaja, 1973

Type-species (by original designation): *Tetradella costata* Ivanova, 1960

Diagnosis: Median-sized to large, smooth, quadrilobate valves. All lobes except L2 protrude over dorsal margin; lobes depressed centrally, dorsal and ventral ends are bulb-like (except L2). L1 and L2 bend towards each other dorsally. Marginal surface has two ridges: a connecting lobe anteriorly and ventrally forms a histium-like ridge (broader in females) which, together with the velum, borders an antrum-like canaliculus. Velum in both dimorphs is ridge-like anteriorly and ventrally and bulge-like posteriorly.

Remarks: V.A. Ivanova (*in* A.F. Abushik *et al., Prakticheskoe rukovodstvo po mikrofaune SSSR*, **4**, 63, 1990) considers that *Valentella* is a synonym of *Sibiritella* Kanygin, 1967. *Sibiritella* is indeed generally similar in lobation but differs by its lobal asymmetry and in lacking adventral sculptures (see R.E.L. Schallreuter and A.V. Kanygin, *Stereo-Atlas Ostracod Shells*, **19**, 37–40, 1992).

In having two adventral ridges, which could be considered as a histium and a velum, *Valentella* resembles many tetradelline and sigmoopsine palaeocopes. The anterior u-shaped furrow between the histium-like ridge and velum in the females of *Valentella* looks like an antrum, but contrary to typical antra it is not closed at its anterior end. Furthermore, the histial dimorphism in tetradellids normally has associated velar dimorphism (the main dimorphism in that group), but that is not the case in *Valentella*. Indeed, the development of a histial antrum and an associated lack of velar dimorphism would be unique within the family. Thus, it is more probable that *Valentella* is a member of the Siberian family Egorovellidae (see Kanygin, 1971, *op. cit.*), which is characterized by parallel ridges in the anterior part of the female valve. *Valentella* differs from the other members of that family (*Bodenia* Ivanova, 1959, *Egorovella* Ivanova, 1959, *Egorovellina* Kanygin, 1965) by having only two adventral ridges.

Explanation of Plate 23, 82

Figs. 1, 2, ♀ RV (**MB O.220**, 2.20 mm long): fig. 1, ext. lat.; fig. 2, ext. ant. Figs. 3, 4, ♀ LV (**MB O.221**, 2.27 mm long): fig. 3, ext. ant.; fig. 4, ext. lat.

Scale A (250 μm; ×30), fig. 1; scale B (250 μm; ×37), figs. 2, 3; scale C (250 μm; ×28), fig. 4.

Valentella costata Ivanova, 1960

1960 *Tetradella costata* V. Ivanova, sp. nov. V. Ivanova, *Materialy k "Osnovam paleontologii"*, 3, 80, 81, fig. 7.
1967 *Sibiritella costata* (V. Ivanova), 1959; A.V. Kanygin, *Ostrakody ordovika gornoj sistemy Cherskogo*, 9, 88, 92–94, 111, 125, 135, 137, 138, 140, 152; table 2 (p. 117), 3, 6, 10, pl. 18, figs. 1–10a.
1971 *Sibiritella costata* (V. Ivan., 1959); A.V. Kanygin, *Trudy Inst. geol. i geofiz. Sibirsk. otd. Akad. nauk SSSR (IGiG)*, **128**, 81, 82, table 7 (p. 25).
1973 *Valentella costata* V. Ivanova; A. I. Neckaja, *Trudy VNIGRI*, **324**, 10, 36–37 (*pars*), 72 (*Valentinella c.*), table 1.
1974 *Sibiritella costata* (V. Ivanova); G.R. Kolosnitsyna *in* L.V. Ogienko *et al., Biostratigrafija kembrijskich i ordovikskich otlozenij juga Sibirskoj platformy*, 49, 97, pl. 33, figs. 10, 11.
1979 *Sibiritella costata* (V. Ivanova, 1959); V.A. Ivanova, *Trudy Paleont. Inst. Akad. nauk SSSR*, **172**, 164, 165, 167, pl. 14, figs. 8, 9.
?1982 *Sibiritella costata* (V. Ivanova); Ju.I. Tesakov *et al., Trudy IGiG*, **506**, 46, 47, 48, fig. 5.
?1982 *Sibiritella costata* (V. Ivanova), 1969; A.V. Kanygin, *Ibid.*, **506**, 99, pl. 24, fig. 10.
?1982 *Sibiritella costata* 3 K.N. Volkova *et al., Ibid.*, **506**, 178.
1984 *Sibiritella costata* V. Ivan.; A.V. Kanygin *et al., Ibid.*, **590**, 12.
1984 *Sibiritella costata* (V. Ivanova, 1955); A.V. Kanygin, *Ibid.*, **590**, 92, pl. 22, fig. 3 (not *S. rara* as stated on p. 222).
1985 *Sibiritella costata* (V. Ivan.); A.V. Kanygin, *Ibid.*, **615**, 7.
1989 *Sibiritella costata* (V. Ivanova); A.V. Kanygin *et al., Trudy IGiG*, **751**, 18, 20, 152, fig. 3 (14/15; log), table 2 (144/5).

Holotype: Institute of Palaeontology, Russian Academy of Sciences, Moscow (**PIN**), no. **1544/7**; right valve (1.92 mm long).

Type locality: River Mojero, Siberian platform; Volginian, Krivolukian, middle Ordovician.

Figured specimens: Museum für Naturkunde, Berlin (**MB**), Germany, nos. **MB O.220** (♀ RV: Pl. **23**, 82, figs. 1, 2), **MB O.221** (♀ LV: Pl. **23**, 82, figs. 3, 4), **MB O.222** (♂ LV: Pl. **23**, 84, figs. 1, 2) and **MB O.223** (♂ RV: Pl. **23**, 84, figs. 3, 4).

All from D'yukunak: boring 1–4, depth 135.1 m; Morkoka River, Siberian platform; approximately lat. 64° 45′ N, long. 62° 30′ E. Volginian, middle Ordovician.

Diagnosis: As for genus, which is presently monotypic.

Remarks: The specimens figured here differ slightly from the holotype by their larger size and more node-like appearance of the dorsal and ventral ends of the lobes (except L2 dorsally). This material possibly represents a distinct subspecies.

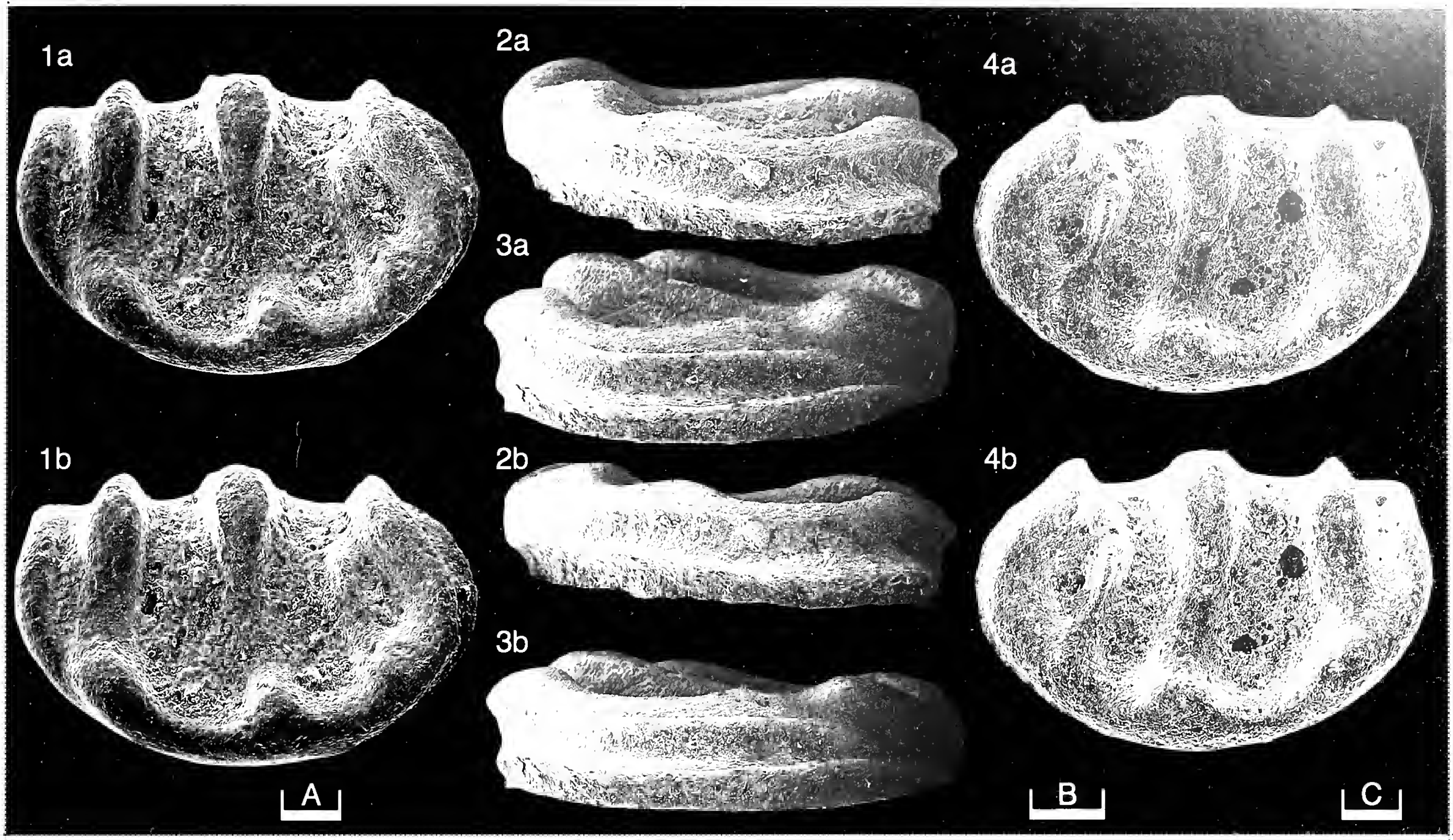
The specimen figured in Kanygin 1982 (*op. cit.*) differs from the material presented herein by its dorsally shorter lobes which do not protrude over the hinge-line.

Distribution: Middle Ordovician. Volginian, Krivolukian of Siberian platform (at rivers Mojero, Lena [d. Polovinka], Bol'shaya Patoma, Emel'yanovka, Right Rassokha, Uchugur, and Kalajka). Upper Guragirskian of River Kulyumbe. Volchinskian of Selennyaskian kryazh. Darpirskian of Omulevskian mountains. Morkiskian of Inan'i basin.

Explanation of Plate 23, 84

Figs. 1, 2, ♂ LV (**MB O.222**, 2.34 mm long): fig. 1, ext. lat.; fig. 2, ext. ant. Figs. 3, 4, ♂ RV (**MB O.223**, 2.46 mm long): fig. 3, ext. ant.; fig. 4, ext. lat.

Scale A (250 μm; ×27), fig. 1; scale B (250 μm; ×37), figs. 2, 3; scale C (250 μm; ×26), fig. 4.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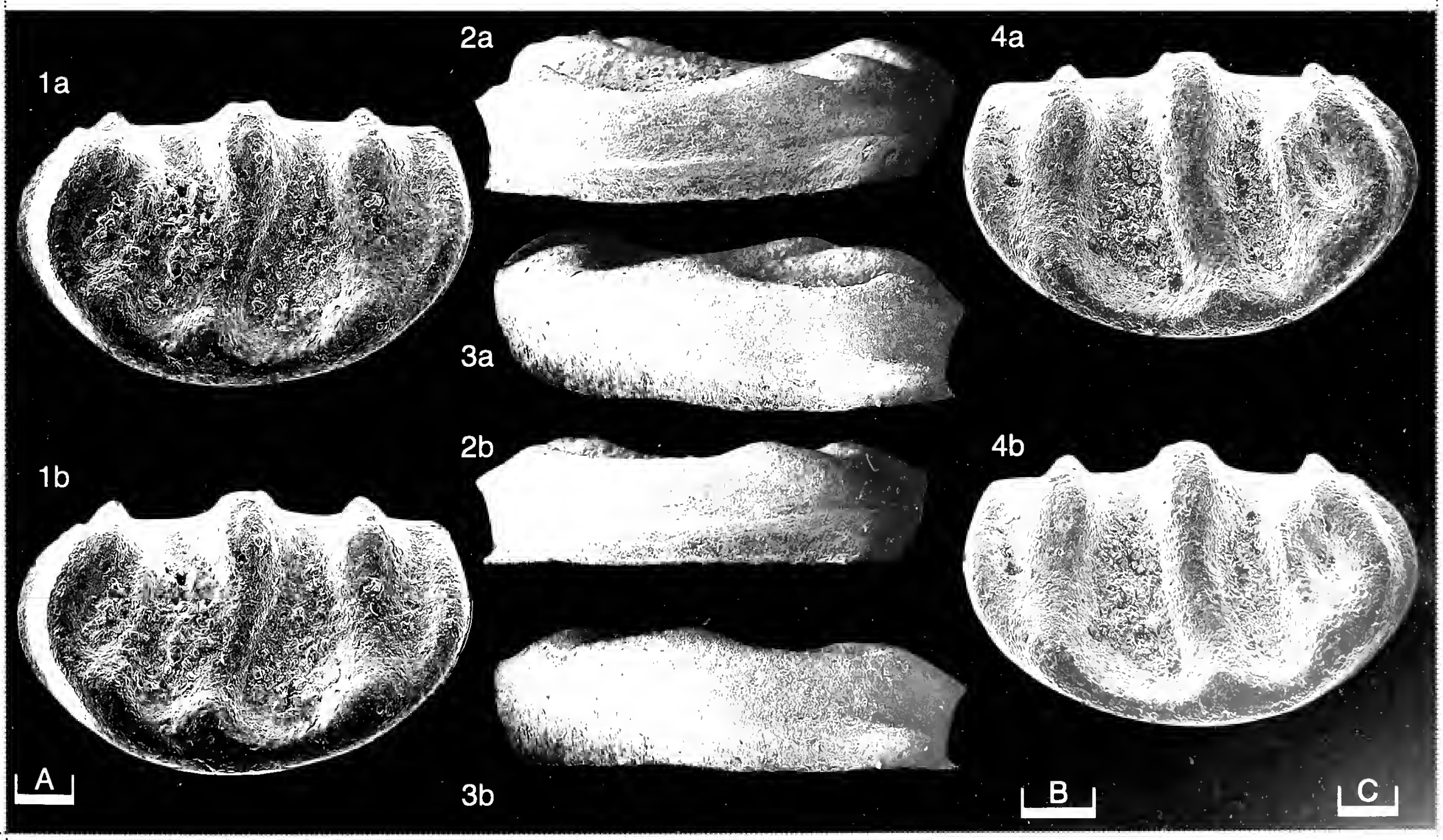
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595.330 (113.24) (485:161.013.58):551.351 + 552.52

ON *TRAPEZILITES MINIMUS* (KUMMEROW)

by Ingelore C.U. Hinz-Schallreuter
(Museum für Naturkunde, Berlin, Germany)

Genus *TRAPEZILITES* Hinz-Schallreuter, 1993

Type-species (by original designation): *Aristozoe*? *minima* Kummerow, 1931

Diagnosis: Small to median-sized falitid. Shape very high. Outline rounded-trapezoidal, subamplete. Maximum length below mid-height, maximum convexity in dorsocentral field. Valve rapidly flattening towards anterior margin. Posterior slope straight, passing into a flat perimarginal area. Lobation consists of single prominent node in anterodorsal region. Outer surface smooth.

Remarks: The occurrence of an interdorsum in *Trapezilites* is documented herein for the first time. Similar to other species, the interdorsum, is broadest anteriorly and narrows towards the posterior end. The interdorsal borders are almost straight and subparallel, converging at the cardinal corners. Cardinal spines are not developed; instead, the cardinal corners are slightly upraised, as in the Australian middle Cambrian *Ulopsis ulula* Hinz, 1991 (*Stereo-Atlas Ostracod Shells*, Pl. **18**, 70, figs. **1**, **2**).

Trapezilites resembles *Falites* Müller, 1964 in the presence of a main anterodorsal node (N1), but differs in both shape and outline. *Trapezilites* is more symmetrical and not so distinctly postplete like *Falites* and its shape is markedly higher. Furthermore the type-species, *Falites fala* Müller, 1964, shows a flat, indistinct second node (N3) in the posterodorsal region together with a third, very weak inflation just behind the main (N3) node (see Hinz-Schallreuter, *Stereo-Atlas Ostracod Shells*, Pl. **23**, 89–94, 1996); these lobal features are, however, missing in congeneric species such as *F. unisulcatus* (Müller, 1982). The doublure in *Trapezilites* is more or less evenly developed and fairly broad. It seems to broaden slightly posteriorly, which is, however, not comparable with the situation in *Falites fala*, where the asymmetrical doublure may extend over more than a third of the entire valve.

Explanation of Plate 23, 86

Figs. 1, LV , ext. lat. (**UB 82**, 0.76 mm long). Fig. 2, car., ext. dors. (**UB 83**, 0.73 mm long). Fig. 3, RV, ext. lat. (**UB 84**, 0.57 mm long). Scale A (100 μm; ×80), fig. 1; scale B (100 μm; ×90), fig. 2; scale C (1000 μm; ×110), fig. 3.

Trapezilities minimus (Kummerow, 1931)

1927 *Aristozoë* cf. *primordialis* Linnrss sp.; E. Kummerow, *Jb. Preuß. Geol. Landesanst.*, **48**, 42, 43, pl. 2, fig. 19.
1931 *Aristozoe*? *minina* n. sp. E. Kummerow, *Cbl. Miner., geol. u. Paläont. B*, **1931** (5), 255, fig. 18.
1964 *Falites*? *minima* [*recte: -us*] (Kummerow); K.J. Müller, *N. Jb. Geol. Paläont. Abh.*, **121**(1), 29, 30, 38, 40, 45, pl. 4, figs. 8–12, 16, table 3.
1965 *Falites minima*? (Kummerow); F. Adamczak, *Stockholm Contr. Geol.*, **13**, 28, text-fig. 2, pl. 1, fig. 3a–b.
1972 *Falites*? *minimus* (Kummerow); K. Taylor and A.W.A. Rushton, *Bull. Geol. Surv. Gr. Brit.*, **35**, 13, pl. 4 (faunal log).
1974 ?*Falites minimus;* A. Martinsson *in* C.H. Holland (Ed.), *Cambrian of the British Isles, Norden, and Spitsbergen*, 208. J. Wiley, London.
1978 *Falites*? *minimus* (Kummerow); A.W.A. Rushton, *Palaeontology* **21**(2), 277, text-fig. 2 (faunal log), pl. 26, figs. 9, 10.
1979 *Falites*? *minima* (Kummerow); K.J. Müller, *Lethaia,* **12**(1), 11.
1984 *Falites*? *minima* [*recte: -us*] (Kummerow); J. Gründel *in* J. Gründel and A. Buchholz, *Freiberger Forschungshefte C*, **363**, 63, 70, pl. 3, figs. 7, 8.
1986–7 *Aristozoe*? *minima* (Kummerow); E.K. Kempf, *Sonderveroeff. geol. Inst. Univ. Koeln*, **50**, 65; **51**, 369; **52**, 167.
1986–7 *Falites*? *minimus* (Kummerow) Mueller; E.K. Kempf, *Sonderveroeff. geol. Inst. Univ. Koeln,* **50**, 355; **51**, 370; **52**, 436.
1993 *Trapezilites minimus* (Kummerow); I. Hinz-Schallreuter, *Arch. Geschiebekde.*, **1**(7), 402.

Holotype: A right valve, apparently now lost. The specimen has not been located at the Bundesanstalt für Geowissenschaften und Rohstoffe, Berlin, where it was deposited (Kummerow, 1931).

Type locality: Degerhamn, Isle of Öland, Baltic Sea (long. 16° 25′ E, lat. 56° 21.5′ N).

Diagnosis: As for the genus, which is presently monotypic.

Figured specimens: Institute of Palaeontology, University of Bonn (**UB**; I. Hinz nos.), **UB 82** (LV: Pl. **23**, 86, fig. 1), **UB 83** (car.: Pl. **23**, 86, fig. 2), **UB 84** (RV: Pl. **23**, 86, fig. 3), **UB 85** (RV: Pl. **23**, 88, fig. 1), **UB 86** (RV: Pl. **23**, 88, fig. **2**), **UB 87** (RV: Pl. **23**, 88, fig. 3). All material from sample 975 of Müller (1964); upper Cambrian, Falbygden, Västergötland, Sweden.

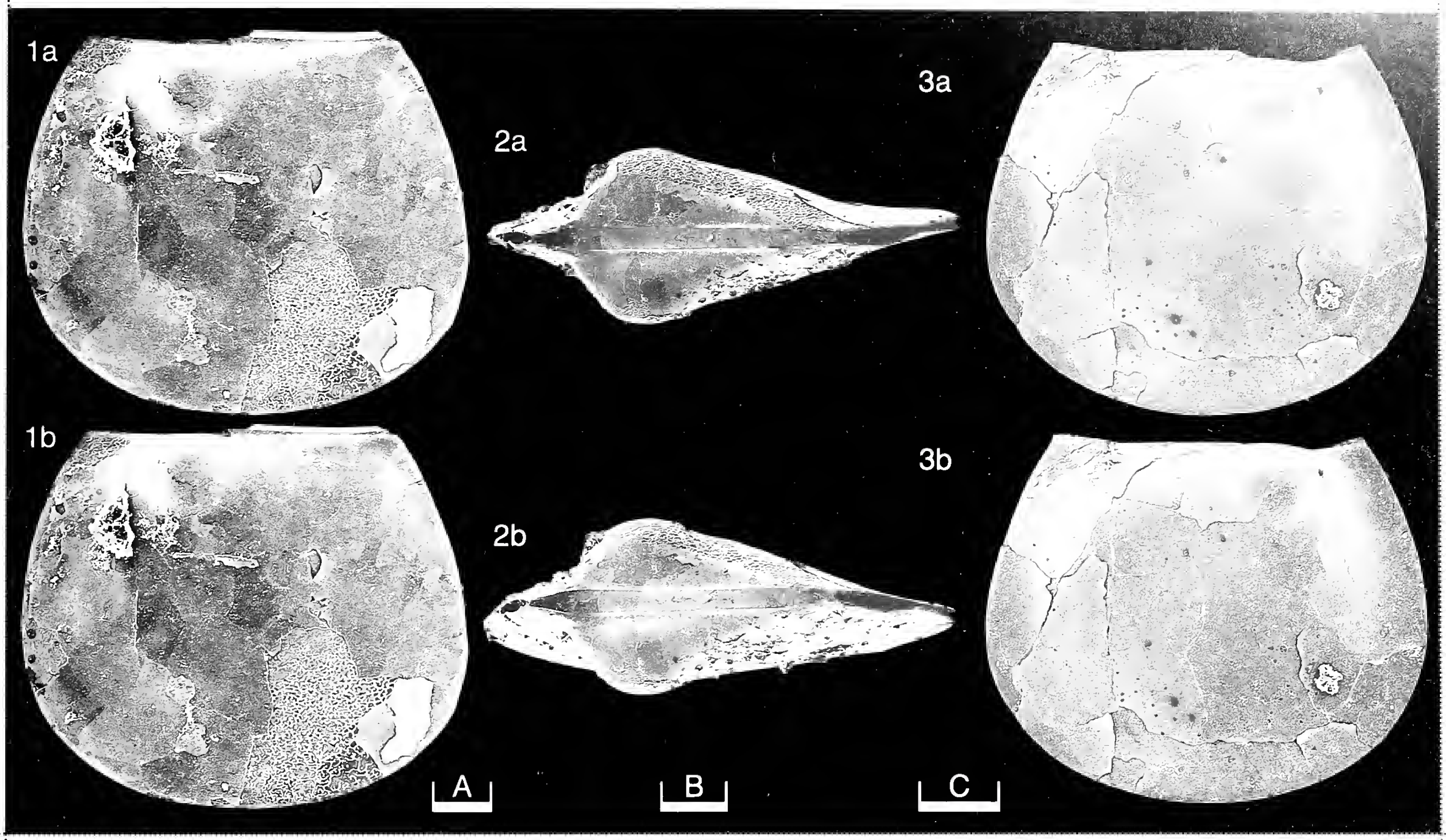
Remarks: This species is characterized by a distinct doublure, sometimes even with attached soft inner lamella (Pl. **23**, 88, figs. 2, 3). Although being secondarily phosphatized, the originally soft part of the lamella is strongly wrinkled and thus distinctly set off from the smooth doublure. It is assumed that the doublure, which corresponds to the mineralized inner lamella of post-Cambrian ostracods, is exclusively formed as an extension of the outer lamella. However, structures, such as specific pore canals, have not been observed so far, neither at the bend itself nor between the smooth doublure and the coarsely phosphatized soft inner lamella. It is presently unknown, whether the inner lamella of the Phosphatocopa is restricted to the phosphatized soft lamella or participated in one way or another in the formation of the doublure.

Distribution: Upper Cambrian (stages 1, **2**, and 5) of Sweden and geschiebes (glacial erratic boulders) of N Germany. Also the *Agnostus pisiformis* Zone, Outwoods Fm, Nuneaton district, England.

Acknowledgements: I thank Prof. K.J. Müller for material and the Deutsche Forschungsgemeinschaft for funding.

Explanation of Plate 23, 88

Fig. 1, RV, ext. lat. (**UB 85**, 0.95 mm long). Fig. 2, RV, int. lat. (**UB 86**, 0.61 mm long). Fig. 3, RV, int. lat. (**UB 87**, 0.61 mm long). Scale A (100 μm; ×65), fig. 1; scale B (100 μm; ×100), figs. 2, 3.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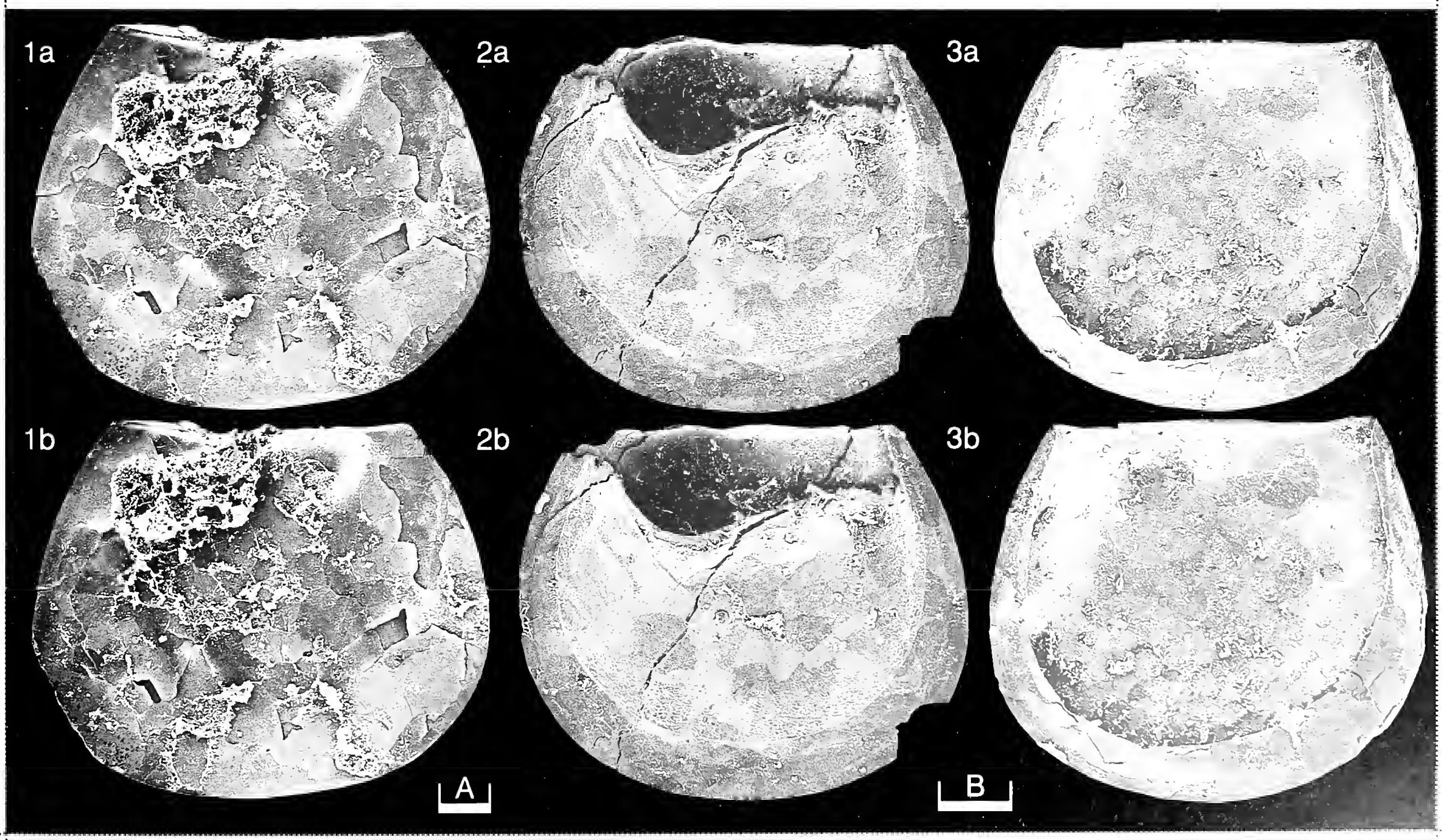
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595.330 (113.24) (485 : 161.013.58) : 551.351 + 552.52

ON *FALITES FALA* MÜLLER

by Ingelore C.U. Hinz-Schallreuter
(Museum für Naturkunde, Berlin, Germany)

Genus *FALITES* Müller, 1964

Type-species (by original designation): *Falites fala* Müller, 1964

Diagnosis: Equivalved, medium-sized and with subamplete to slightly postplete outline. A weak retral swing may be developed. Hinge-line straight, with almost completely reduced interdorsum. Maximum length of valve above mid-height, maximum convexity in anterocentral field. Free margin evenly developed with large doublure along inner side. Doublure broadest ventrally and posteroventrally. Lobation consists of prominent anterodorsal node. One or two further but weaker nodes occur near dorsal margin in larger larvae and adults. Outer surface smooth.

Remarks: *Falites*, type-genus of the family Falitidae, was erected on the basis of, among other features, its simple hinge (K.J. Müller, *N. Jb. Geol. Paläont. Abh.* **121**, 24, 1964). Hinz-Schallreuter (1993, *Arch. Geschiebekde.*, **1**(7), 400–2) concluded that the upper Cambrian *Hesslandona unisulcata* Müller, 1982, with its distinct interdorsum, also belonged to *Falites*, a genus which consequently comprised species with or without an interdorsum. SEM studies have since shown a very small, rudimentary interdorsum in Müller's topotype material of *F. fala*. Apparently there is a similar phylogenetic reduction of the interdorsum to that noted in the genus *Vestrogothia* Müller, 1964. In *F. fala*, the simple hinge line branches and diverges towards the cardinal spine (Pl. **23**, 92, fig. 2); a similar feature can also be observed in *Vestrogothia spinata* Müller, 1964. This feature documents the relic of an interdorsum which is well developed in middle Cambrian representative of both genera.

The families Falitidae and Vestrogothiidae invariably comprise interdorsum-bearing taxa, thus invalidating the supposed main difference with the Hesslandonidae as originally defined. However, these families can be distinguished by other features. The Vestrogothiidae Kozur, 1974 are characterized by a modified contact margin while those of the Falitidae is straight and simple. The vestrogothiid contact margin in larger larvae and adults is not evenly developed but modified by overlapping lappets and/or spines. The situation in the monotypic Hesslandonidae is yet unclear, because the type-species is insufficiently known in this respect.

Falites fala Müller, 1964

1964 *Falites fala* n. sp. K.J. Müller, *N. Jb. Geol. Paläont. Abh.*, **121**(1), 8, 9, 10, 13, 16, 25, 26, 28, 39, 40, 44, 46, pl. 3, figs. 3–10, pl. 5, fig. 6, text-fig. 2, table 3.
1965 *Falites fala* Müller; F. Adamczak, *Stockholm Contr. Geol.*, **13**, 28, 29 text-fig. 1, pl. 1, fig. 4, 5a–c.
1974 *Falites fala*; A. Martinsson *in* C.H. Holland (Ed.), *Cambrian of the British Isles, Norden and Spitsbergen*, 208, 212. J. Wiley, London.
1978 *Falites fala* Müller; A.W.A. Rushton, *Palaeontology*, **21**(2), 276–7 (*pars*); *non* 276–7 (*pars*), text-fig. 2 (faunal log), pl. 26, fig. 12 (= *F. unisulcatus*, Hinz-Schallreuter 1993, *op. cit.*).
1979 *Falites fala* Müller; K.J. Müller, *Lethaia*, **12**(1), 11–20, text-figs. 10, 11, 21, 25.
1983 *Falites fala* Müller; K.G. McKenzie, K.J. Müller and M.N. Gramm *in* F.R. Schram (Ed.), *Crustacean Phylogeny*, 36, fig. 6. A.A. Balkema, Rotterdam.
1984 *Falites fala* K.J. Müller; J. Gründel *in* J. Gründel and A. Buchholz, *Freiberger Forschunshefte C*, 363, 63, 69, pl. 2, figs. 6, 7.
1986–7 *Falites fala* Mueller; E.K. Kempf, *Sonderveroeff. geol. Inst. Univ. Koeln*, **50**, 355; **51**, 216; **52**, 436.

Explanation of Plate 23, 90

Figs. 1, LV , ext. lat. (**UB 88**, 1.23 mm long). Fig. 2, juv. LV, ext. lat. (**UB 89**, 0.49 mm long). Fig. 3, RV, ext. lat. (**UB 90**, 1.39 mm long).
Scale A (200 μm; ×55), figs. 1, 3; scale B (100 μm; ×110), fig. 2.

1991 *Falites fala* Müller; Huo Schicheng, Shu Degan & Cui Zhilin, *Cambrian Bradoriida of China*, 181, 182. Geol. Pub. House, Beijing.
1993 *Falites fala* Müller; I. Hinz-Schallreuter, *Arch. Geschiebekde.*, **1**(7), 400.

Holotype: Institute of Palaeontology, University of Bonn, Germany (**UB**), no. **29** (Müller, 1964, pl. 3, fig. 4).

Type locality: Stenåsen, Falbygden, Västergötland, Sweden; lower subzone of Zone 5c, upper Cambrian.

Diagnosis: Outline slightly postplete with weak retral swing; hinge without distinct interdorsum. Up to at least 1.47 mm long. Lobation comprises three subdorsal nodes (N1, N2, and N3), but only anterior node (N1) distinctly developed. Valves flattened along free margin in a broad zone which corresponds to the doublure. The latter is extremely broad posteroventrally. Outer surface smooth.

Figured specimens: Institute of Palaeontology, University of Bonn (**UB**), nos. **UB 88** (LV: Pl. **23**, 90, fig. 1), **UB 89** (juv. RV: Pl. **23**, 90, fig. 2), **UB 90** (RV: Pl. **23**, 90, fig. 3), **UB 91** (LV: Pl. **23**, 92, fig. 1), **UB 92** (post. incomplete car.: Pl. **23**, 92, fig. 2), and **UB 93** (car.: Pl. **23**, 92, fig. 3). All material is topotypic, from sample 975 of Müller (1964); upper Cambrian, Falbygden, Västergötland, Sweden.

Remarks: Müller's largest original specimen (1964, fig. 2) is 1.47 mm long. Later he mentioned specimens of *Falites* up to 1.9 mm long (Müller 1979, p. 21). If the latter specimens really belong to *F. fala*, the number of ontogenetic stages in the species have to be more than the 15 he originally considered to be present (Müller 1964, 13). Based on topotype material together with part of the original ontogenetic series (Müller 1964, fig. 2 [UB 61]) individual growth stages are hardly recognizable (Text-figs. 1, 2). However, an obvious feature is the ontogenetic change in shape (L : H ratio; "gestalt"). Initially it becomes more elongate, but from about 0.6 mm onward, the shape becomes gradually higher, and from about 1.1 mm length it seems to stay constant.

The outline is also an ontogenetically influenced character and changes are roughly comparable with what is known from, for example, oepikalutids, which change from subamplete to distinctly postplete because of a supposed increase in the development of the abdomen (Hinz-Schallreuter in prep.). Young instars of *F. fala* are also subamplete, changing during ontogeny into a distinctly postplete outline. A prominent retral swing, like that in the oepikalutids, is not developed, since the rudimentary abdomen is quite small (McKenzie *et al.*, 1983, fig. 2).

The lobation accords with the development of the body, too. In young instars of *F. fala* only the anterior node is fairly well observable. The other, subdorsal nodes gradually appear during growth, but always remain rather weak. By contrast, the doublure is present in its final proportions even in the smallest recorded instars. In phosphatocopine ostracods the doublure (duplicature = *Umschlag* of Müller 1964), which corresponds to the mineralized part of inner lamella in post-Cambrian ostracods, is probably formed of the outer lamella alone.

In some specimens of *F. fala* more or less large parts of the central region of the inner lamella (*Innenlamelle* sensu Müller) may also be present (Pl. **23**, 92, fig. 1). The inner lamella was orginally soft. Secondary phosphatization caused a somewhat wrinkled surface structure which Müller (1964, p. 44) erroneously interpreted as marks of the genital apparatus.

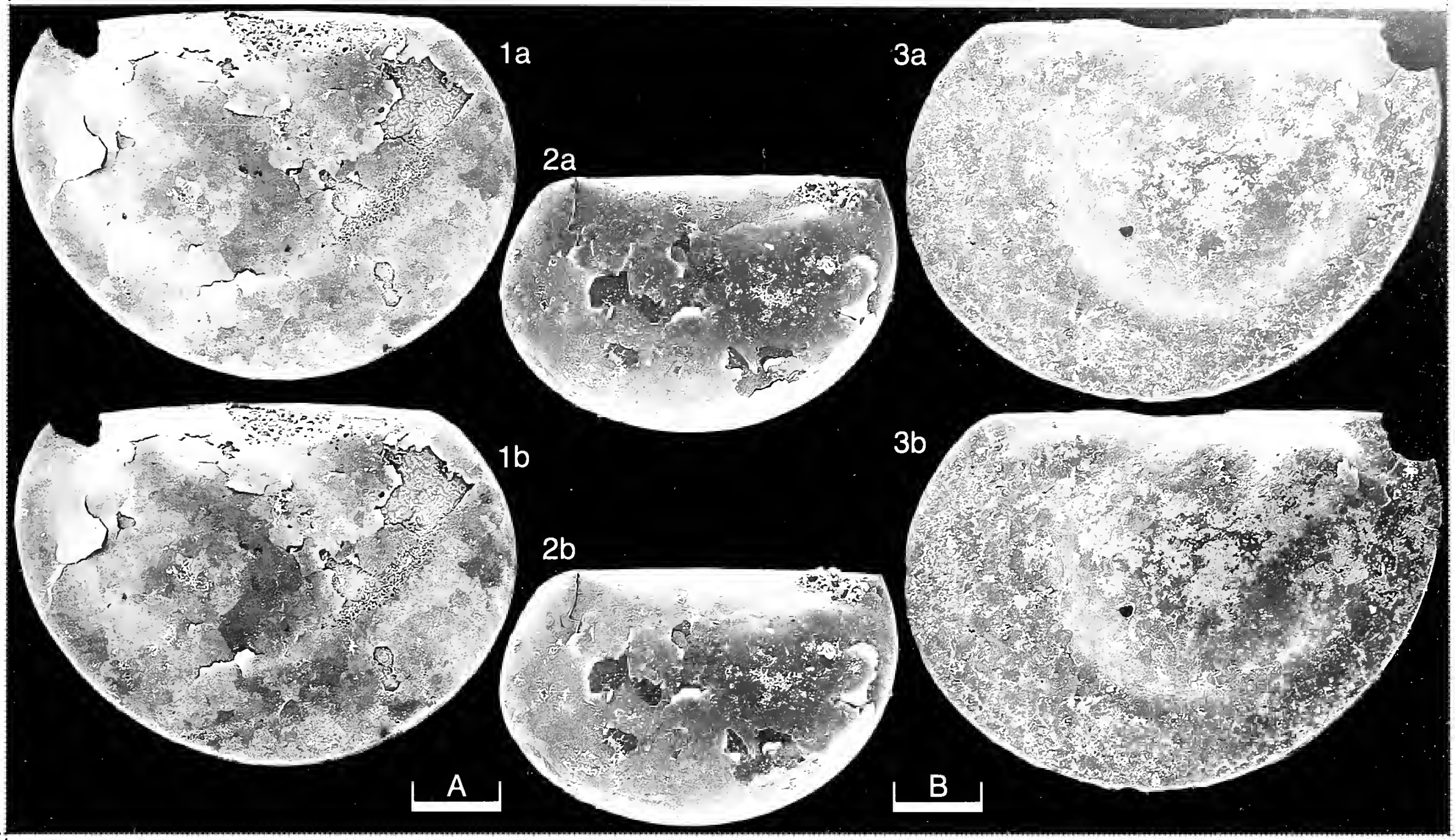
Falites is known from *F. fala, F. cycloides* and *F. angustiduplicatus* (all Müller 1964) and *F. unisulcatus* Müller, 1982. *F. pateli* Landing, 1980 (*J. Paleont.*, **54**) is a questionable representative from the lower Cambrian of North America. Contrary to the broad and asymmetrical sculpture in *F. fala*, the doublure of *F. angustiduplicatus* is more or less evenly developed and rather narrow. In *F. cycloides* the doublure is also more symmetrical and even somewhat broader than in *F. fala*. The middle to upper Cambrian *F. unisulcatus* differs markedly from *F. fala*, not only by its broad interdorsum (see Müller *in* R. H. Bate *et al.*, 1982, *Fossil and Recent Ostracoda*, pl. 6, figs. 2, 4, 5a; Ellis Horwood, Chichester), but also by its tuberculate outer surface, its less distinct postplete outline, in virtually lacking N2 and N3, and in its less broad (especially posteriorly) perimarginal area (Hinz-Schallreuter 1993, figs. 7.1a, b).

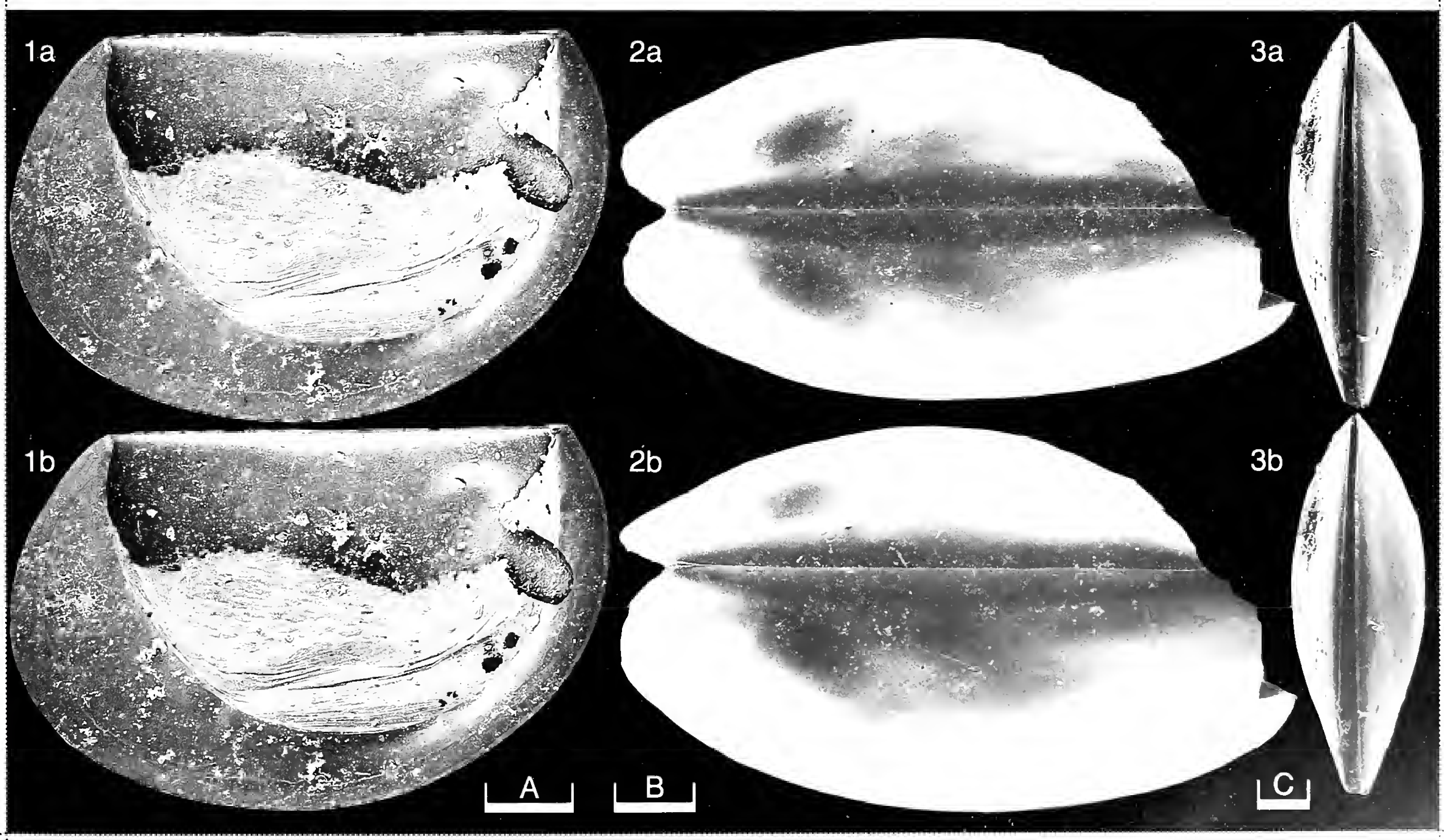
Distribution: Originally recorded not only from the type horizon, but also from the lowermost upper Cambrian *Agnostus pisiformis* Zone (6 valves) and questionably (single specimen) from Zone 2 (Muller 1964, 25, table 3). It is possible that these non topotype specimens belong to *F. unisulcatus*, which currently has a known range of middle to lower Upper Cambrian (Rushton 1978, Müller 1982, Hinz-Schallreuter 1993).

Acknowledgements: I thank Prof. K. J. Müller for material and the Deutsche Forschungsgemeinschaft for financial support.

Explanation of Plate 23, 92

Fig. 1, LV, int. lat. (**UB 91**, 0.74 mm long). Fig. 2, car., post. incomplete, ext. dors. (**UB 92**, 0.92 mm long). Fig. 3, car., ext. vent. (**UB 93**, 0.78 mm long).
Scale A (100 μm; ×110), fig. 1; scale B (100 μm; ×105), fig. 2; scale C (100 μm; ×70), fig. 3.


1a
2a
3a
1b
2b
3b
A
B


1a
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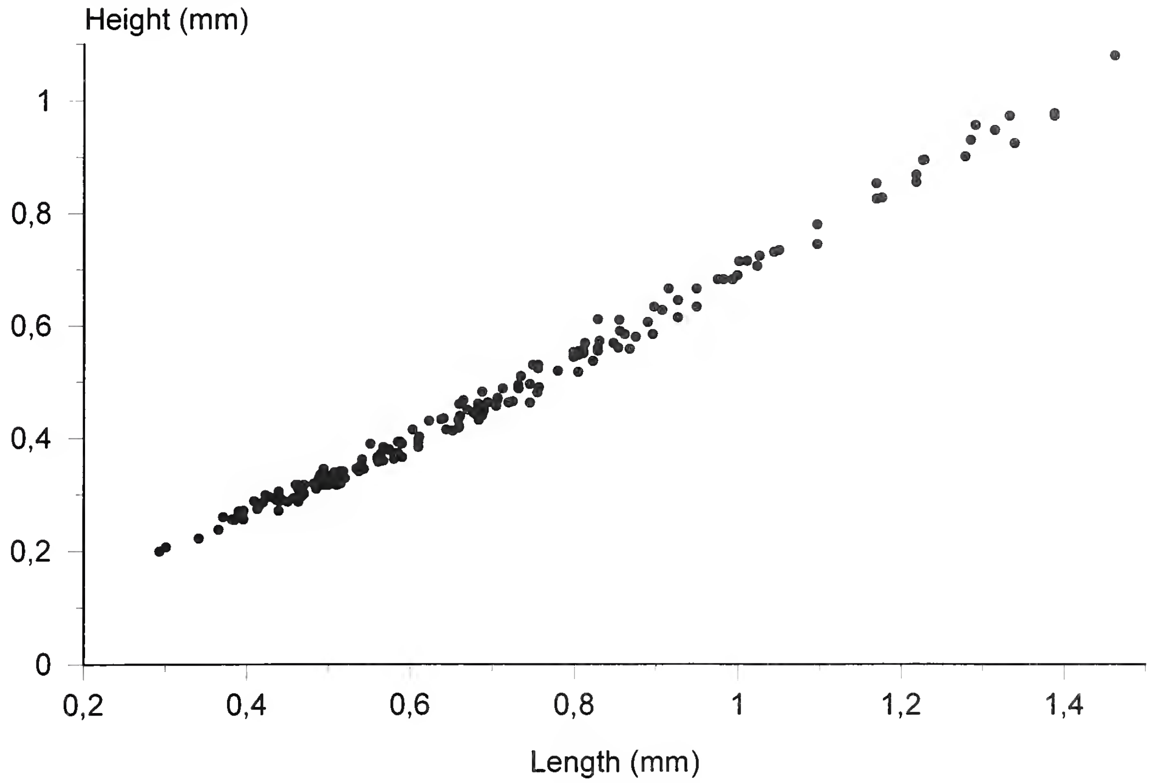
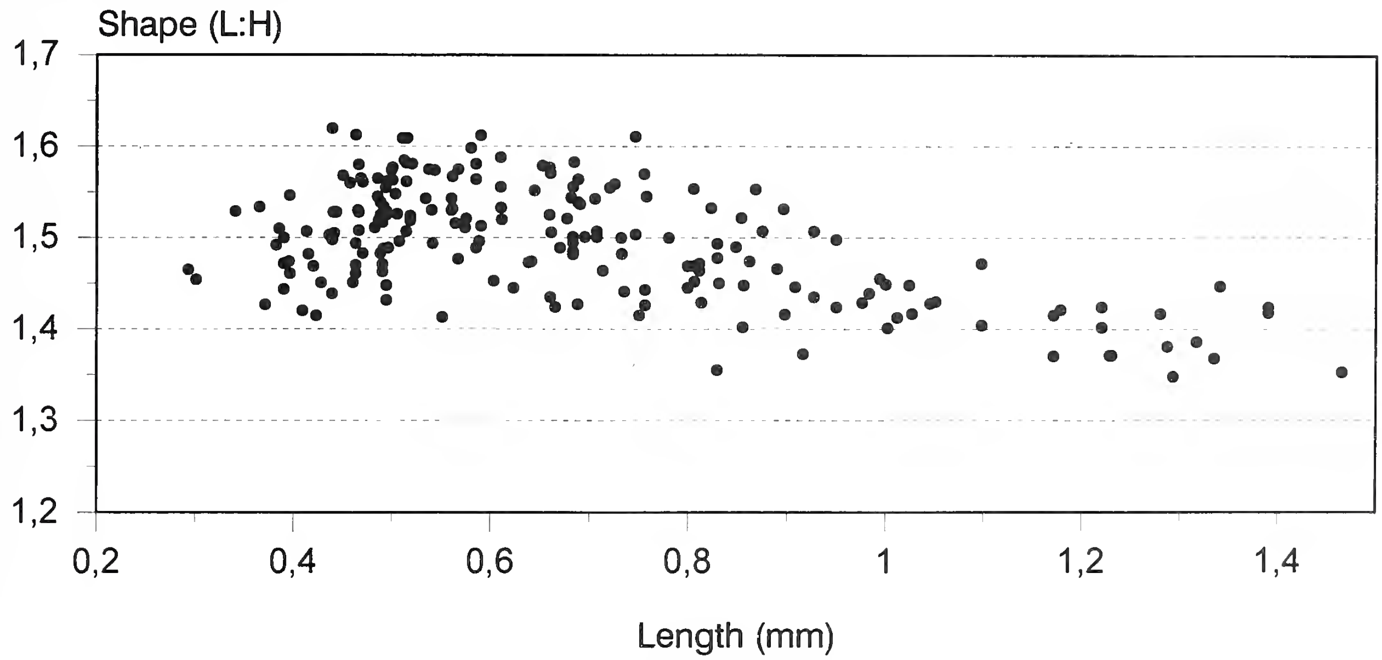
1b
2b
3b
A
B
C



Text-fig. 1. Ontogeny of *Falites fala*: length (L) versus height (H). All specimens come from the type locality (sample 975 of Müller 1964).



Text-fig. 2. Ontogeny of *Falites fala*: length versus shape (length : height ratio; "gestalt"). All specimens come from the type locality (sample 975 of Müller 1964).

Stereo-Atlas of Ostracod Shells 23 (21) 95 (1996)
595.337.14 (118.15) (265 : 162.180.18) : 551.352 + 552.54

ON *CYTHEROPTERON KEMPFI* BOOMER nom. nov.

by Ian Boomer
(School of Environmental Sciences, University of East Anglia, Norwich, England, U.K.)

Cytheropteron kempfi nom. nov.

non 1932 *Cytheropteron nudum* n. sp., J. Sulc, *Prace Geol-Paleont. ust Karlovy Univ.* 1932. 6.
1995 *Cytheropteron nudum* sp. nov., I. Boomer, *Stereo-Atlas Ostracod Shells,* **22**, 108–111.

Remarks: Dr Eugene Kempf (University of Köln) has kindly informed me that I created a primary homonym when naming *Cytheropteron nudum* (Boomer, 1995). Dr Kempf has informed me that the name is preoccupied by a species described by Sulc (1932) from the Cretaceous of Bohemia. I therefore wish to replace the homonym with the new name *Cytheropteron kempfi* in recognition of Dr Kempf's invaluable efforts to maintain taxonomic stability within our science.

Erratum

The following page has been reprinted from Volume 22, part 2. A printing error led to this page being reproduced on the reverse of another text page.

Stereo-Atlas of Ostracod Shells 22 (22) 96–103 **(1995)**
595.336.14 (113.333) (766 : 162.097.34 + 768 : 162.089.35): 551.351 + 552.52

ON *KIRKBYRHIZA PRIMAEVA* (ROTH)

by Gerhard Becker & Robert F. Lundin
(Senckenberg Museum, Frankfurt-am-Main, Germany & Arizona State University, Tempe, U.S.A.)

Genus *KIRKBYRHIZA* gen. nov.
Type-species: *Amphissites primaevus* Roth, 1929

Derivation of name: From Greek *rhiza*, root; alluding to the root-stock of the kirkbyaceans. Gender, feminine.

Diagnosis: Kirkbyacean ostracod with broad and diffuse lateral lobes; posterior lobe more conspicuous than anterior lobe. Vertical (sulcal) depression rather distinct (Upper Silurian type-species) to obsolete (additional, early Devonian species), terminating ventrally in well developed adductorial pit; corresponding adductorial boss on the interior surface prominent, but interior reflection of sulcal depression dorsal to the adductorial boss weak or even absent. Dorsal surface epicline. Primarginal (outer) carina poorly developed ventrally, distinct anteriorly and posteriorly; extending onto dorsal surface at both cardinal corners, very weak on anterodorsal surface. Very fine marginal ridge on left valve. Right valve with distinct contact groove, slightly larger than left; below cardinal angles, contact slightly discontinuous; hinge structure straight and with weak cardinal projections (terminal teeth) on left valve and weak cardinal depressions (terminal sockets) on right valve.

Remarks: *Kirkbyrhiza* is a typical kirkbyacean, as shown by its carapace shape, the presence of admarginal structures and the subcentral position of the adductor muscle field which apparently is an apomorphic character.

Kirkbyrhiza primaeva (Roth, 1929) is the oldest known kirkbyacean species and near the origin of this group. The sulcal depression, terminating ventrally in the adductorial pit (only conspicuous in the type-species), is considered to be an ancestral character (S2) inherited from its presumed (hypothetical) drepanellid ancestors. The ambivalent affinity of the new genus to both the Amphissitidae Knight, 1928 (with lobes and subcentral node) and the Arcyzonidae Kesling, 1961 (without the subcentral node), shown also by the early Devonian *Eoarcyzona* Becker & Wang (*Palaeontographica*, A **124**, 18, 1992), confirms the close

Explanation of Plate 22, 97

Fig. 1 adult car., rt. ext. lat. (**X-248**, 1390 μm long). Fig. 2, adult LV, int. lat., detail showing anterior cardinal tooth (arrow) (**X-249**, 1505 μm long). Fig. 3, adult LV, ext. lat. (**X-257**, 1365 μm long).
Scale A (300 μm; ×59), fig. 1; scale B (100 μm; ×205), fig. 2; scale C (300 μm; ×60), fig. 3.

relationship between the Amphissitidae and the Arcyzonidae. Because of its rather simple carapace morphology, *Kirkbyrhiza* is placed in the Arcyzonidae.

Distribution: Presently known from the type-species, which occurs in the Upper Silurian (Ludlow and Přídolí series) of western Tennessee and south-central Oklahoma, and by an additional species, *Amphissites retiferus* Roth, 1929, from the Lower Devonian (Lochkovian) of the same areas.

Kirkbyrhiza is probably endemic to the North American midcontinent area.

Kirkbyrhiza primaeva (Roth, 1929)

1929 *Amphissites primaevus* sp. nov. R. Roth, *J. Paleont.*, 3, 346, pl. 36, fig. 10a.
1961 *Reticestus? primaevus* (Roth); I.G. Sohn, *Prof. Pap. U.S. geol. Surv.*, **330-B**, 140, pl. 11, figs. 29–32.
1965 *Amphissella primaeva* (Roth); R.F. Lundin, *Bull. Okla geol. Surv.*, **108**, 39, pl. 6, figs. 1a–j.

Holotype: United States National Museum of Natural History, Washington (**USNM**) no. **80658H**; juvenile right valve. This specimen was illustrated by Lundin (1965) but not by Roth (1929), who illustrated only a paratype (**USNM 80658A**), a juvenile left valve.

Type locality: The locality data given by Roth (1929) strongly suggests that the holotype is from Upper Silurian (late Ludlow-Přídolí) strata of the Henryhouse Fm. The species is certainly present in that unit at Lundin's (1965, *op. cit.*) section P3; approximate lat. 34° 35′ N, long. 96° 50′ W (see also T.W. Amsden, *Bull. Okla geol. Surv.*, **84**, panel 2, 1960).

Figured specimens: Department of Geology, Arizona State University (**ASU**), nos. **X-248** (car.: Pl. **22**, 97, fig. 1), **X-249** (LV: Pl. **22**, 97, fig. 2), **X-250** (LV: Pl. **22**, 99, fig. 1, Pl. **22**, 103, fig. 2), **X-251** (RV: Pl. **22**, 99, figs. 2, 3), **X-252** (car.: Pl. **22**, 101, figs. 1, 4), **X-253** (LV: Pl. **22**, 103, fig. 1), **X-254** (RV: Pl. **22**, 103, fig. 4), **X-255** (RV: Pl. **22**, 103, fig. 3), **X-256** (RV: Pl. **22**, 103, fig. 5) and **X-257** (LV: Pl. **22**, 97, fig. 3). **USNM 80658H** (holotype, juv. RV: Pl. **22**, 101, fig. 2), **USNM 80658A** (paratype, juv. LV: Pl. 101, fig. 3).

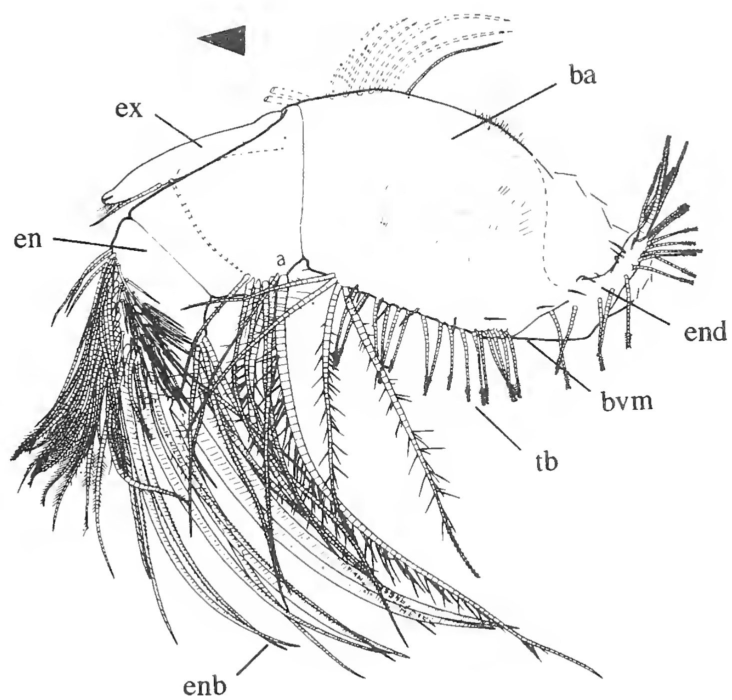
ASU X-248 and **X-250** to **X-257** are from Lundin's (1965) sample P5–9, 15.1 m above the base of the Brownsport Fm at section P5, a glade 9.2 km SE of Decaturville, Peryville Quadrangle, Decatur County, Tennessee, U.S.A.; lat. 35° 30′ 49.5″ N, long. 88° 3′ 24″ W. **ASU X-249** is from the middle part of the Brownsport Fm (sample 06–8) at section 06, a roadcut along U.S. Highway 64, approximately 3.7 km SW of Olivehill, Olivehill Quadrangle, Hardin County, Tennessee, U.S.A.; lat. 35° 15′ 29.5″ N, long. 88° 4′ 6″ W. **USNM 80658H** and **80658A** are from the type locality. All figured specimens are of Ludlow or Přídolí, Upper Silurian age.

Diagnosis: *Kirkbyrhiza* species with a comparatively conspicuous sulcal depression and slightly irregular reticulation pattern.

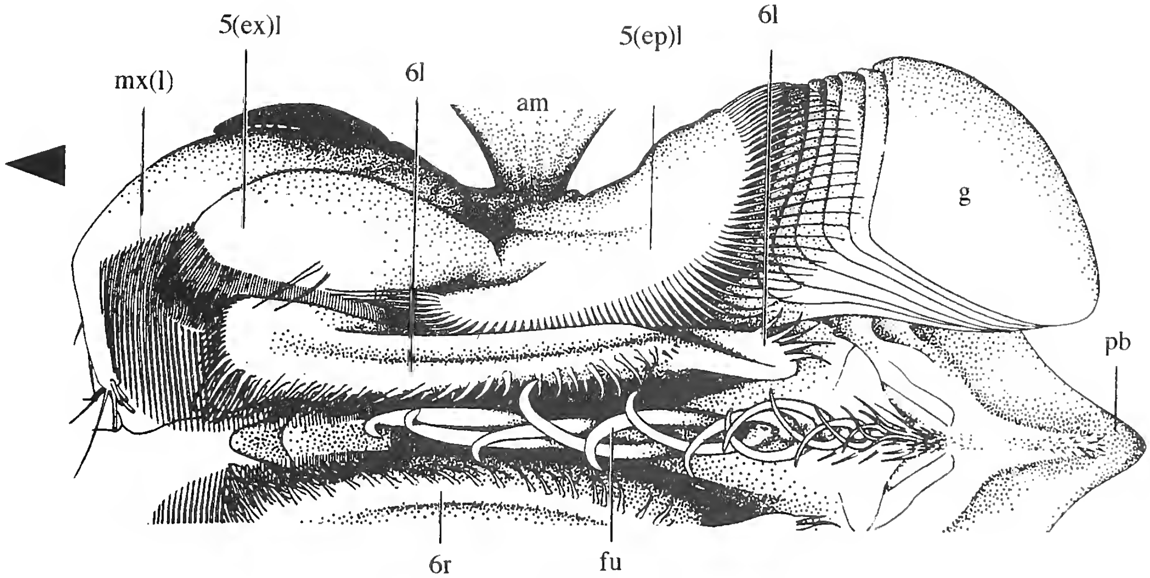
Remarks: The reticulation pattern approximately parallels the free margin. On the lateral surface of the lobes near the sulcal depression,

Explanation of Plate 22, 99

Fig. 1, adult LV, int. lat. (**X-250**, 1350 μm long). Figs. 2, 3, adult RV (**X-251**, 1355 μm long): fig. 2, int. lat., detail showing anterior cardinal depression (arrow); fig. 3, int. lat.
Scale A (300 μm; ×66), fig. 1; scale B (100 μm; ×102), fig. 2; scale C (300 μm; ×62), fig. 3.



Text-fig. 2. Lateral view of mandible of the Recent cylindroleberidid *Leuroleberis sharpei* Kornicker (1981, fig. 30).
Arrow points anteriorly. ba: basipodite. bvm: basal ventral margin. en: 1st podomere of endopodite. enb: bristles of endopodite. end: endite with triaenid tip. ex: exopodite. tb: triaenid bristles.



Text-fig. 3. Reconstruction of the ventral morphology of the Recent cylindroleberidid *Cyclasterope hendersoni* Brady, 1897 (modified from Cannon 1933, fig. 6a). The maxilla and the 5th limb plays an important role by ventilating the domicilar cavity and filtering food particles.
Arrow points anteriorly. am: left adductor muscles bundle. fu: furcal lamellae. mxl: left maxilla. g: gill. pb: posterior part of body. 5(ep)l: epipodite of left 5th limb. 5(ex)l: exopodite of left 5th limb. 6l: left 6th limb. 6r: right 6th limb.

Acknowledgements: We thank the Royal Society/CNRS and NATO for their support, L. Melnikova (Moscow) for loan of the material, J. Dzik (Warsaw) for correspondence and L. Kornicker (Washington) and M-C. Guillaume (Paris) for information on Recent cylindroleberidids.

General Index

Ayress, M., On *Pellucistoma punctata* Ayress sp. nov.; 5–8

Baltonotella kuckersiana (Bonnema); 69–72
Boomer. I. & Jellinek, T., On *Ogmoconcha contractula* Triebel; 53–60
Boomer, I., On *Cytheropteron kempfi* Boomer nom. nov.; 95
Boomer, I., On *Eucytherura loenensis* Boomer sp. nov.; 13–16

caboverdensis, Orionina; 29–34
contractula, Ogmoconcha; 53–60
costata, Valentella; 81–84
Cytherellina elegans (Jones); 45–48
Cytherellina ruperti L.E. Petersen & R.F. Lundin sp. nov.; 49–52
Cytheropteron kempfi Boomer; 95

Darwinula incae Delachaux; 35–40
Dickson, C.P., On *Swainocythere miniscula* (Ruggieri); 1–4

Echinocythereis leckwijcki Wouters sp. nov.; 25–28
elegans, Cytherellina; 45–48
Eucypris virens (Jurine); 61–68
Eucytherura loenensis Boomer sp. nov.; 13–16

Fala, Falites; 89–94
Falites fala Müller; 90–94
fulva, Hemicytherura; 9–12

Hemicytherura fulva McKenzie, Reyment & Reyment; 9–12
Hinz-Schallreuter, I.C.U., On *Falites fala* Müller, 89–94
Hinz-Schallreuter, I.C.U.; on *Trapezilites minimus* (Kummerow); 85–88

incae, Darwinula; 35–40
inexpecta, Schizocythere; 21–24

Jellinek, T. & Boomer, I., *Ogmoconcha contractula* Triebel; 53–60

Karinutatia ren Schallreuter; 73–76
kempfi, Cytheropteron; 95
kuckersiana, Baltonotella; 69–72

leckwijcki, Echinocythereis; 25–28
loenensis, Eucytherura; 13–16
Lundin, R.F. & Petersen, L.E., On *Cytherellina elegans* (Jones); 45–48
Lundin, R.F. & Petersen, L.E., On *Cytherellina ruperti* Petersen & Lundin sp. nov.; 49–52
Lundin, R.F. & Petersen, L.E., On *Wenlockiella phaseola* (Jones); 41–44

Majoran, S., On *Scepticocythereis sanctivincentis* Majoran sp. nov.; 17–20
Majoran, S., On *Schizocythere inexpecta* McKenzie, Reyment & Reyment; 21–24
Martens, K. & Smith, R., On *Eucypris virens* (Jurine); 61–68
Martens, K., Rossetti, G. & Mourguiart, P., On *Darwinula incae* Delachaux; 35–40
McKenzie, K.G., Reyment, R.A. & Reyment, E.R., On *Hemicytherura fulva* McKenzie, Reyment & Reyment; 9–12
minimus, Trapezilites; 85–88
miniscula, Swainocythere; 1–4
Mourguiart, P., Martens, K. & Rossetti, G., On *Darwinula incae* Delachaux; 35–40

Ogmoconcha contractula Triebel; 53–60
Orionina caboverdensis Wouters sp. nov.; 29–34
ovalis, Soanella; 77–80

Pellucistoma punctata Ayress sp. nov.; 5–8
Petersen, L.E. & Lundin, R.F., On *Cytherellina elegans* (Jones); 45–48
Petersen, L.E. & Lundin, R.F., On *Cytherellina ruperti* Petersen & Lundin sp. nov.; 49–52
Petersen, L.E. & Lundin, R.F. On *Wenlockiella phaseola* (Jones); 41–44
phaseola, Wenlockiella; 41–44
punctata, Pellucistoma; 5–8

ren, Karinutatia; 73–76
Reyment, E.R., McKenzie, K.G. & Reyment, R.A., On *Hemicytherura fulva* McKenzie, Reyment & Reyment; 9–12
Reyment, R.A., McKenzie, K.G. & Reyment, E.R., On *Hemicytherura fulva* McKenzie, Reyment & Reyment; 9–12
Rossetti, G., Martens, K. & Mourguiart, P., On *Darwinula incae* Delachaux; 35–40
ruperti, Cytherellina; 49–52

sanctivincentis, Scepticocythereis; 17–20
Scepticocythereis sanctivincentis Majoran sp. nov.; 17–20
Schallreuter, R.E.L., On *Baltonotella kuckersiana* (Bonnema); 69–72
Schallreuter, R.E.L., On *Karinutatia ren* Schallreuter; 73–76
Schallreuter, R.E.L., On *Soanella ovalis* (Ivanova); 77–80
Schallreuter, R.E.L., On *Valentella costata* (Ivanova); 81–84
Schizocythere inexpecta Majoran sp. nov.; 21–24
Smith, R. & Martens, K., On *Eucypris virens* (Jurine); 61–68
Soanella ovalis (Ivanova); 77–80
Swainocythere miniscula (Ruggieri); 1–4

Trapezilites minimus (Kummerow); 85–88

Valentella costata (Ivanova); 81–84
virens, Eucypris; 61–68

Wenlockiella phaseola (Jones); 41–44
Wouters, K., On *Echinocythereis leckwijcki* Wouters sp. nov.; 25–28
Wouters, K., On *Orionina caboverdensis* Wouters sp. nov.; 29-34

Index; Geological Horizon

See **1** (1) 5–22 (**1973**) for explanation of the Schedules in the Universal Decimal Classification

(113.24) Upper Cambrian:
Falites fala; 89–94
Trapezilites minimus; 85–88

(113.31) Ordovician:
Cytherellina elegans; 45–48

(113.312) Middle Ordvician:
Baltonotella kuckersiana; 69–72
Karinutatia ren; 73–76
Soanella ovalis; 77–80
Valentella costata; 81–84

(113.331) Lower Silurian:
Cytherellina ruperti; 49–52
Wenlockiella phaseola; 41–44

(113.333) Upper Silurian:
Cytherellina ruperti; 49–52

(116.212) Middle Liassic:
Ogmoconcha contractula; 53–60

(118.14) Eocene:
Hemicytherura fulva; 9–12
Scepticocythereis sanctivincentis; 17–20

(118.15) Oligocene:
Cytheropteron kempfi; 95
Eucytherura loenensis; 13–16
Schizocythere inexpecta; 21–24

118.21) Miocene:
Echinocythereis leckwijcki; 25–28

(119.4) Holocene:
Pellucistoma punctata; 5–8
Swainocythere miniscula; 1–4

(119.9) Recent:
Darwinula incae; 35–40
Eucypris virens; 61–68
Orionina caboverdensis; 29–34

Index; Geological Location

See **1** (1) 5–22 (**1973**) for explanation of the Schedules in the Universal Decimal Classification

(261.1) Atlantic Ocean:
Orionina caboverdensis; 29–34

(261.27) Irish Sea:
Swainocythere miniscula; 1–4

(265) Pacific Ocean:
Eucytherura loenensis; 13–16
Cytheropteron kempfi; 95

(265.7) Southern and South-west Pacific:
Pellucistoma punctata; 5–8

(420) England:
Eucypris virens; 61–68
Cytherellina elegans; 45–48
Cytherellina ruperti; 49–52
Wenlockiella phaseola; 41–44

(430) Germany:
Karinutatia ren; 73–76
Ogmoconcha contractula; 53–60

(438) Poland:
Baltonotella kuckersiana; 69–72

(485) Sweden:
Falites fala; 89–94
Trapezilites minimus; 85–88

(493) Belgium:
Echinocythereis leckwijcki; 25–28

(57) Asiatic Former Soviet Union:
Soanella ovalis; 77–80
Valentella costata; 81–84

(84) Bolivia:
Darwinula incae; 35–40

(94) Australia:
Hemicytherura fulva; 9–12
Scepticocythereis sanctivincentis; 17–20
Schizocythere inexpecta; 21–24

Stereo-Atlas of Ostracod Shells: Vol. 23, Parts 1 and 2

CONTENTS

23 (1) 1–4 On *Swainocythere miniscula* (Ruggieri); by C.P. Dickson.
23 (2) 5–8 On *Pellucistoma punctata* Ayress sp. nov.; by M. Ayress.
23 (3) 9–12 On *Hemicytherura fulva* McKenzie, Reyment & Reyment; by K.G. McKenzie, R.A. Reyment & E.R. Reyment.
23 (4) 13–16 On *Eucytherura loenensis* sp. nov.; by I. Boomer.
23 (5) 17–20 On *Scepticocythereis sanctivincentis* sp. nov.; by S. Majoran.
23 (6) 21–24 On *Schizocythere inexpecta* sp. nov.; by S. Majoran.
23 (7) 25–28 On *Echinocythereis leckwijcki* sp. nov.; by K. Wouters.
23 (8) 29–34 On *Orionina caboverdensis* sp. nov.; by K. Wouters.
23 (9) 35–40 On *Darwinula incae* Delachaux; by G. Rossetti, K. Martens & P. Mourguiart.
23 (10) 41–44 On *Wenlockiella phaseola* (Jones); by L.E. Petersen & R.F. Lundin.
23 (11) 45–48 On *Cytherellina elegans* (Jones); by L.E. Petersen & R.F. Lundin.
23 (12) 49–52 On *Cytherellina ruperti* sp. nov.; by L.E. Petersen & R.F. Lundin.
23 (13) 53–60 On *Ogmoconcha contractula* Triebel; by I. Boomer & T. Jellinek.
23 (14) 61–68 On *Eucypris virens* (Jurine); by R. Smith & K. Martens.
23 (15) 69–72 On *Baltonotella kuckersiana* (Bonnema); by R.E.L. Schallreuter.
23 (16) 73–76 On *Karinutatia ren* Schallreuter; by R.E.L. Schallreuter.
23 (17) 77–80 On *Soanella ovalis* (Ivanova); by R.E.L. Schallreuter.
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